September 2026 • Issue #591

AMSTATNEWS

The Membership Magazine of the American Statistical Association • *https://magazine.amstat.org*

DATA LITERACY EDUCATION: Why We Need More Than Technical Skills

SPECIAL SECTION ON EDUCATION:

Students Statistical Thinking When Using Generative AI

What Students Taught Me About Teaching Statistics

Day in the Life of Statistics Educators

Thank you to our JSM 2026 SPONSORS

PLATINUM

abbvie

jmp STATISTICAL DISCOVERY
ASA MISSION PARTNER

sas
ASA SUPPORTING PARTNER

Takeda

GOLD

BERRY

Bristol Myers Squibb
ASA CHAMPION PARTNER

Lilly

MERCK

NOVARTIS

NATIONAL SECURITY AGENCY

Pfizer

PHASE V
Adaptive. Causal. Intuitive.

STATA
ASA MISSION PARTNER

Westat

SILVER

AstraZeneca

BeOne

Cytel
ASA CHAMPION PARTNER

Hill Research

Jane Street

Johnson&Johnson
ASA CHAMPION PARTNER

Lumina FOUNDATION

MIT MANAGEMENT
BUSINESS ANALYTICS

Otsuka

P&G
ASA SUPPORTING PARTNER

PROMETRIKA
A FULL-SERVICE CRO

VERTEX

AMSTATNEWS

SEPTEMBER 2026 • ISSUE #591

Executive Director
Ron Wasserstein: *ron@amstat.org*

Associate Executive Director
Donna LaLonde: *donnal@amstat.org*

Director of Science Policy
Steve Pierson: *pierson@amstat.org*

Director of Finance and Administration
Derek Curtis II: *derek@amstat.org*

Managing Editor
Megan Murphy: *megan@amstat.org*

Communications Strategist
Val Nirala: *val@amstat.org*

Advertising Manager
Christina Bonner: *cbonner@amstat.org*

Production Coordinators/Graphic Designers
Olivia Brown: *olivia@amstat.org*
Megan Ruyle: *meg@amstat.org*

Contributing Staff Members
Kim Gilliam

Amstat News welcomes news items and letters from readers on matters of interest to the association and the profession. Address correspondence to Managing Editor, *Amstat News,* American Statistical Association, 277 South Washington Street, Suite 370, Alexandria, 22314-3646 USA or email *amstat@amstat.org*. Items must be received by the first day of the preceding month to ensure appearance in the next issue (for example, June 1 for the July issue). Material can be sent as a Microsoft Word document, PDF, or within an email. Articles will be edited for space. Accompanying artwork will be accepted in graphics file formats only (.jpg, etc.), minimum 300 dpi.

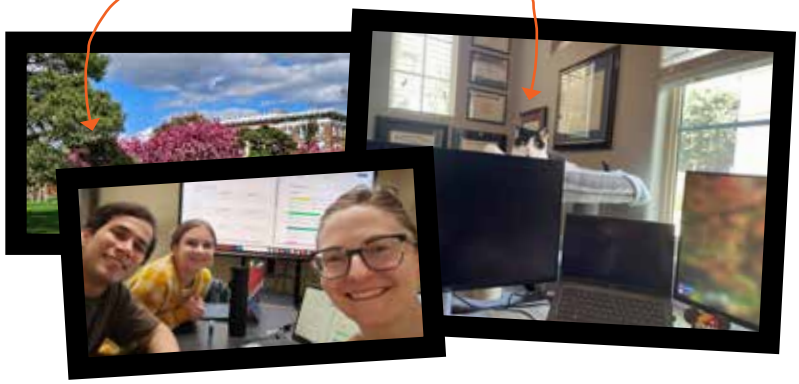
Amstat News (ISSN 0163-9617) is published eight times a year, February, March, April, June, August, September, November, and December, by the American Statistical Association, 277 South Washington Street, Suite 370, Alexandria, 22314-3646 USA. Business and Editorial Offices: 277 South Washington Street, Suite 370, Alexandria, 22314-3646 USA. Accounting and Circulation Offices: 2277 South Washington Street, Suite 370, Alexandria, 22314-3646. Call (888) 231-3473 to subscribe. **Periodicals postage is paid** at Alexandria, VA. POSTMASTER: Send address changes to *Amstat News,* 277 South Washington Street, Suite 370, Alexandria, 22314-3646 USA. Send Canadian address changes to APC, PO Box 503, RPO West Beaver Creek, Rich Hill, ON L4B 4R6. *Amstat News* is the member publication of the ASA. For annual membership rates, see *www.amstat.org/join* or contact ASA Member Services at (888) 231-3473.

American Statistical Association
277 South Washington Street, Suite 370
Alexandria, VA 22314 USA
(703) 684-1221
ASA GENERAL: *asainfo@amstat.org*
ADDRESS CHANGES: *addresschange@amstat.org*
AMSTAT EDITORIAL: *amstat@amstat.org*
ADVERTISING: *advertise@amstat.org*
WEBSITE: *https://magazine.amstat.org*

The American Statistical Association is the world's largest community of statisticians. The ASA supports excellence in the development, application, and dissemination of statistical science through meetings, publications, membership services, education, accreditation, and advocacy. Our members serve in industry, government, and academia in more than 90 countries, advancing research and promoting sound statistical practice to inform public policy and improve human welfare.

features

SPECIAL SECTION ON STATISTICS EDUCATION



EVENTS & OPPORTUNITIES

BASS XXXIII

The 33rd Biopharmaceutical Applied Statistics Symposium will take place November 2–3 at the Hotel Indigo Savannah Historic District in Savannah, Georgia. Speakers from academia and the pharmaceutical industry will present one-hour tutorials about diverse topics related to research, clinical development, and pharmaceutical regulation. BASS will also offer a poster session. Visit the symposium website at *www.bassconference.org* for details.

Pop Quiz: What Should Every Student Know About Data and Computing?

Listen to Episode 68 of the *Practical Significance* podcast, where hosts Donna LaLonde and Ron Wasserstein welcome Nick Horton and Anna Bargagliotti to discuss the National Academies report *Data and Computing in K–12 Foundational Competencies 2026*, which is available as a free downloadable PDF at *www.nationalacademies.org/publications/29303*. In the podcast, they explain why teacher preparation is essential to successful implementation of the report's recommendations. They also discuss the role of artificial intelligence in education and its limitations. Listen in at *https://magazine.amstat.org/podcast-2*.

ONLINE

Update on Diversity in Education

As a new academic year begins, the landscape of diversity, equity, and inclusion in higher education continues to evolve. In this month's JEDI corner, David Corliss looks at the changes shaping DEI programs, reviews the challenges facing colleges and universities, and shares how institutions are adapting while continuing to support student success, ethics, and inclusion. Read his takeaway online at *https://magazine.amstat.org*.

Can AI Make Data Analysis More Accessible?

How could AI change the way we analyze data? A new article in *The American Statistician* explores the growing role of large language model–powered agents in statistics and data science. Through real-world case studies, the authors examine how these tools can make sophisticated data analysis more accessible while considering the challenges and research needed to make AI-powered statistical analysis more reliable and effective. Visit *Amstat News* online to read more about the latest issue of *TAS*. *https://magazine.amstat.org*

columns

member news

Connect with us on LinkedIn
www.linkedin.com/company/american-statistical-association---asa

Join the ASA Community
http://community.amstat.org

Like us on Facebook
www.facebook.com/AmstatNews

Follow us on Bluesky
https://bsky.app/profile/amstatnewsbskysocial

Follow us on Instagram
www.instagram.com/AmstatNews

Subscribe to our YouTube channel
www.youtube.com/user/AmstatVideos

Visit *Amstat News* online

The Open Door: Finding Your Place in the ASA Vision and Mission

Jeri Mulrow

Imagine a world that relies on data and statistical thinking to drive discovery and inform decisions. I am introducing this month's column with the ASA vision statement because I returned from the Joint Statistical Meetings more optimistic and enthusiastically ready to work with our amazing community to make our vision a reality. As I acknowledged in my president's address, our challenges are real. However, reading the comments and seeing the delightful pictures posted on social media, I am confident we are ready to meet the challenges.

As my colleague Richard Zink shared on LinkedIn, "#JSM2026 was a whirlwind: teaching, speaking, chairing, catching up with old acquaintances and developing new ones. In a very technical and uncertain time, I really appreciated the camaraderie, support, and laughter I personally experienced and observed throughout the convention center. It was inspiring and makes me optimistic for what the future holds."

First-time attendee Beenu Sareena ended her LinkedIn post with this comment: "Thank you to everyone who made this week so welcoming. I left JSM feeling motivated, grateful, and excited for the future of our community!"

I share her feelings of gratitude and excitement for the future and want to continue the call to action that I made in my president's address.

Our strategic plan has three themes: Enhancing the Diversity and Breadth of Our Association, Increasing the Visibility of Our Profession, and Ensuring the Future of Our Profession. In my talk, I invited you to see each theme as a doorway to enter through as a metaphor for the ways in which you can contribute to the practice and profession of statistics. I asked you to respond to a poll to indicate the "doors" you wanted to open.

Behind door number one was Education and Curriculum, which received 66 votes. What does it look like to walk through this door? For some, it will be contributing to a local ASA DataFest event as an organizer, mentor, or judge. Others may share their expertise by authoring an article for *Statistics Teacher* or STAT*tr@k*. You may volunteer to be a judge for the ASA Data Visualization Poster Contest or the Statistics Project Competition. In the next few weeks, we will be establishing working groups to act on our AI Strategic Plan's Priority on Next-Generation Talent & Education, so this may be a door you choose. Which would you like to explore further, or do you have another approach in mind? If so, let me know by filling out the short form at *https://amstat.jotform.com/form/open-doors.*

Public Policy and Advocacy received 36 votes. Signing up for the Count on Stats newsletter at *https://tinyurl.com/4abp7umu* will not only keep you informed but will also provide an opportunity for you to engage directly with our expert ASA advocacy team. Your contribution may be responding to formal requests for information; calls for public comment; or alerting your local, state, or national representatives of issues that ensure decisions are informed by statistical thinking and data. These are a few ideas, but far from the only possibilities. How would you like to be involved?

In my talk, I acknowledged how important mentors have been in my professional life, so I was delighted that Professional Development and Mentoring received 78 votes. I believe without the support of Fritz Scheuren and Lynda Carlson, I would not be writing this column as president of the ASA. Through the ASA Community, we are launching a new online mentoring platform, MentorLink. Mentees will be able to view prospective mentors' profiles to find the best match for

From small to big, from daily conversations to long-term collaborative projects, every contribution matters . . .

GET INVOLVED
Volunteer with the ASA or share your ideas for topics we should explore. Fill out the form to let us know how you'd like to contribute: *https://amstat.jotform.com/form/open-doors.*

their needs. Profiles will include a recent picture and a bio that will help mentees determine whether to reach out to potential mentors. After it launches later this year, you will need to update your privacy settings and answer yes to "I would like to be included in the member directory and community rosters" to be visible in the MentorLink directory. Watch for the announcement about MentorLink and enter through this door.

Another way I want to encourage you is to help us build a professional development program that is timely and serves your needs. What topics should we explore for short courses at meetings, chapter traveling courses, and virtual offerings? You can tell us your topics and ideas by filling out the form at *https://amstat.jotform.com/form/open-doors*.

The overarching theme for my presidential year is Communities in Action, and I want to encourage you to join the 48 who voted to open the Community Building and Outreach door. One of the next steps for the Communities in Action initiative is to explore the formation of a Communities in Action Outreach Group. There are two main objectives of the outreach group. First is to create and then support a network of statisticians and data scientists who want to actively serve their communities by volunteering their expertise, consistent with ethical practices and standards, to help solve community challenges. Second is to promote community service by telling the stories of statisticians and data scientists who are making an impact on their communities. We need at least 50 ASA members to sign the petition at *https://amstat.jotform.com/form/cia-outreach-group-interest-form* to form the proposed outreach group, so please consider signing.

I highlighted three stories during my talk and invited you to contribute yours. It is easy to do. Just send a virtual postcard with your story to *https://amstat.jotform.com/form/communities-in-action-postcard.*

Yet another way you can build community is by engaging with student groups by joining our speakers bureau at *https://amstat.jotform.com/form/speakers-bureau,* which matches speakers with student groups for both in-person and virtual presentations. Of course, you aren't limited to these choices. Let me know if there is something else you'd like to try.

The final door, which received 78 votes, was Research and Publications. I am proud of the depth, breadth, and quality of the ASA portfolio of journals. Choosing to submit your work to a journal in the ASA portfolio helps sustain the high quality of scientific communication for which our journals are recognized. But a journal article is only one path; I encourage you to consider writing for *CHANCE* or Real World Data Science. Presenting at an ASA conference is also an important part of opening this door. As Hao Sun posted on LinkedIn, "It was a great opportunity to share our work, exchange ideas with colleagues, and receive valuable feedback." What makes the most sense to you?

Looking forward to JSM 2026, Quiyi Wu wrote on LinkedIn, "I'm excited for the journey ahead and look forward to the collaborations, discoveries, and friendships this new chapter will bring." At the beginning of this column, I asked you to imagine a world that relies on data and statistical thinking to drive discovery and inform decisions. Like my colleague Quiyi, I am excited to continue my journey and to open more doors. From small to big, from daily conversations to long-term collaborative projects, every contribution matters, every contribution makes a statement, and every contribution helps build the future.

ASA Journals: A World of Impact

Eric Sampson, ASA Journals Manager

Measuring the impact of scientific publications is a tricky thing. Please don't get me started on the "impact factor," which is certainly useful but equally certain to be misused.

Most readers reach our journals online, so we do have some solid numbers to measure impact. For example:

- In 2025, nearly 3 million articles were downloaded from ASA-owned titles. 2026 is on pace to surpass that number.
- The top five most-downloaded articles in the last 12 months (and published in the last three years) account for 90,141 downloads.
- "The ASA Statement on *p*-Values: Context, Process, and Purpose" continues to lead in the Altmetric Score category at 2370. (The Altmetric Score measures online attention from a variety of sources.)

Readers in North America, Europe, and Asia comprise most users, but Central/South America and Africa users are well represented.

The ASA's journals are an integral part of the foundation for the practice and profession of statistics, while also providing a high-profile platform to showcase the very latest in statistics and data science theory, practice, and tools. As we say in the ASA journals department, no matter how you intersect with statistics—in academia, industry, government, or education—we have a journal for that.

Good to Know

- The ASA has new journals. Be sure to check out *Statistics and Data Science in Imaging* and *ASA Discoveries.* Both are open-access, online-only journals.
- With your ASA membership, you have free online access to all the ASA titles, going back to Volume 1, Issue 1. Did you know you also have complimentary access to the Mathematical Association of America's *Math Horizons*, along with more than 25 other journal titles?
- Authors who publish in ASA journals are encouraged to post the submitted versions of their papers to arXiv or a similar publicly available repository. Authors of accepted papers can post their peer-reviewed versions 12 months after publication.
- Royalties earned by the ASA's journals support the association's programs.
- The ASA Board of Directors reviews all subscription prices and author processing charges. This is only one reason why the ASA's journals are not only world class in content, but also one of the best values around. ■

MORE ONLINE
View the "ASA Statement on *p*-Values: Context, Process and Purpose" at *https://doi.org/10.1080/00031305.2016.1154108.*

View ASA journals at *www.amstat.org/publications/journals.*

MEMBER SHOWCASE

Akua Kwartemaa Owusu: Driven by Curiosity, Guided by Data

Akua Kwartemaa Owusu

Tell us a little about yourself and your path to pursuing a PhD in biostatistics at UNC.

My name is Akua Kwartemaa Owusu, and I am a PhD student in biostatistics at The University of North Carolina at Chapel Hill. I earned my Bachelor of Science in mathematics with a concentration in biostatistics and data science.

I have always been deeply curious about research. From a young age, I was drawn to understanding the "why" and "how" behind things. I liked asking meaningful questions, examining evidence, and using research to uncover answers that could improve health.

My path became clearer when I discovered biostatistics, a field that allowed me to combine my love of statistics, research, and health. I realized that data could be used to describe health challenges, develop solutions, improve clinical decision-making, and influence policies that affect entire populations. Pursuing a PhD in biostatistics at UNC has allowed me to continue developing the methodological, computational, collaborative, and leadership skills needed to contribute meaningfully to global public health and medical research.

What first sparked your interest in statistics and data science?

My interest began in high school, where I loved my statistics classes and became excited by how numbers and probability could be used to uncover patterns and make predictions.

As I explored the field further, I realized statistics and data science could do much more than simply describe data. They could help improve treatments, inform health policy, and identify inequities affecting individuals and communities. What continues to inspire me is knowing that behind every dataset are real people and real experiences. For me, statistics is about using evidence responsibly to answer meaningful questions and create positive change.

Was there a particular experience or mentor who inspired you to pursue biostatistics?

Yes. My very first mentor, Prince Allotey, played an important role in shaping my journey. I met him through StatFest in 2021, when I was just beginning my studies in biostatistics. He encouraged me, connected me with valuable resources, and introduced me to conferences and professional opportunities that broadened my understanding of the field.

I later attended the Joint Statistical Meetings Diversity Mentoring Program in Toronto, where I met other phenomenal mentors, including Dr. Loni Philip Tabb and Courtney Henry. Their support helped me, and continues to help me, recognize what is possible in biostatistics while reinforcing the importance of mentorship, representation, and professional community.

Along the way, I have been fortunate to meet many other mentors, and I can confidently say that each of them has played a pivotal role in my growth and development.

What research questions or topics are you currently exploring?

My current research spans neurological disease, breast cancer in sub-Saharan Africa, artificial intelligence, and global health.

One area of my work focuses on open questions in Huntington disease, including disease progression, biomarker development, prediction, and clinical trial design. I am also examining how image degradation—including blur, changes in brightness, and reduced contrast—affects the performance and reliability of an AI algorithm designed to detect surgical site infections following cesarean delivery in rural Rwanda.

Together, these projects reflect my broader interest in developing statistical and AI-based tools that are equitable and dependable in real-world settings.

Can you share a project that has been especially meaningful to you?

One of the most meaningful projects I am currently working on examines how image quality affects an AI algorithm designed to identify possible surgical site infections following cesarean delivery in rural Rwanda.

For many mothers in rural or resource-limited communities, returning to a hospital after delivery can be difficult because

of distance, transportation costs, and limited access to care. An image-based AI tool could help extend postoperative monitoring and support the earlier identification of complications.

My work evaluates how factors such as blur, poor lighting, and reduced contrast affect the algorithm's performance. The goal is to identify the minimum image quality conditions required to maintain accurate predictions. This is especially important because in real-world settings, image quality can vary depending on lighting and how the photograph is captured.

What makes this project so meaningful is that it sits at the intersection of artificial intelligence, global health, and equity. It is ensuring that innovation is safe, practical, and accessible to the mothers and communities who will benefit from it.

What role do you see statistics playing in addressing health disparities?

Statistics helps make health disparities visible, measurable, and actionable. It allows us to identify which communities are being left behind, understand the factors contributing to inequities, and evaluate whether policies and interventions are creating meaningful change.

Our work in Dr. Loni Philip Tabb's lab examined geographic disparities in cardiovascular health across US counties. This work is a perfect example of how rigorous statistical analysis can uncover disparities that may be hidden within broader averages and provide evidence that guides public health policy and resource allocation.

What advice would you give students considering a career in biostatistics?

Stay curious, and remain open-minded. Biostatistics is a broad and evolving field, with opportunities across public health, pharmaceuticals, clinical trials, genetics, cancer research, artificial intelligence, government, and academia.

I would also encourage students to seek mentorship, attend conferences, become involved in research, build meaningful professional relationships, and embrace opportunities to present and speak, even when those experiences feel intimidating. Challenges are a natural part of the journey, but they can also become powerful steppingstones for growth.

Keep learning. Keep showing up. And never allow difficulty to convince you that you do not belong in this field. Because you do belong, and your unique perspective has tremendous value.

Where do you hope your career takes you after completing your PhD?

I hope to build a career at the intersection of global health and innovative statistical methods that advance public health research across diverse populations.

I also want to advocate for the responsible use of artificial intelligence and emerging technology in biostatistics and healthcare. These tools have tremendous potential, but they must be evaluated for reliability, fairness, transparency, and performance across diverse populations. In healthcare, these tools directly affect a person's treatment, safety, and life. My goal is to help advance innovation while ensuring it remains ethical.

Why did you become a member of the ASA?

I became an ASA member in 2021. As the only student majoring in biostatistics in my undergraduate program, I wanted to find a professional community where I could connect with like-minded people, learn from others, and deepen my understanding of the field.

Through the ASA, I gained access to mentorship, conferences, scholarships, professional development, and the latest advancements in statistics. The association gave me a strong sense of belonging and showed me the importance of building community, especially for students learning to navigate the field.

You currently serve as an ASA social media ambassador. What drew you to this impactful volunteer opportunity?

I am inspired by the advancements happening across statistics and by the people, whose dedication makes them possible. Behind every publication, presentation, and new methodology are years of curiosity, collaboration, perseverance, and hard work.

As an ASA social media ambassador, I have the opportunity to spotlight meaningful contributions, increase their visibility, and make statistics more accessible to a wider audience. I am especially passionate about supporting students and early-career statisticians by sharing scholarships, conferences, mentorship programs, and other opportunities for growth, while also celebrating their achievements and helping their projects gain the recognition they deserve.

What do you enjoy doing outside of statistics and research?

Outside of my work, I enjoy visiting beautiful cities, kayaking, spending time by the lake, and exploring nature. I also love spending time with my friends and family, whether we are having brunch, sharing new experiences together, or attending church. My faith is an important part of who I am, and these moments help me recharge and stay grounded. ■

Welcome TO OUR NEWEST MEMBERS

Eleanor J Addison-Taylor
Emmanuel Agbeli
Sangjin Ahn
Vincent Amoruccio
Na An
Qi An
Brandon Anderson
Cody Arington
Kin Fai Au
Morgane Austern
Aaron Baggett
Daniel Henry
Barch Bryce
Jon Bartlett
Md Abdul Basit
Hillel Bavli
Vijayalaxmi Beeravalli
Souhaib Ben Taieb
Noah Benjamin
Nathan Bernhardt
Thomas Blakely
Amin Borji
Pierre Boyeau
Megan Bruhn
Yunqi Bu
Matthew R. Buras
Diana Cai
Hanchang Cai
Mauricio Campos
Madeleine Carbonneau
Victor M. Castro
Tsai Hor Chan
Gordon Chandler
Helena L. Chang
Kun Chang
Sarah Charlton
Shirshendu Chatterjee
Dieyi Chen
Siqi Chen
David Cheng
Edward K. Cheng
Siliangyu Cheng
Jiwon Choi
Muhammad Abdul Baker Chowdhury
Sirikan Chueamsuwan
Sarah Conner
George M. Cook
Katy Crane
Liyong Cui
Weixiao Dai
Adel Daoud
Ling Deng
Yu Deng
Eskezeia Dessie
Maha Dewidar
Argha Dhar
Joseph Dickerson
Kelly-Ann Dixon Hamil
Rajendar Dommeti
Qunfeng Dong
Kristen Dorrell
Wenxin Du
Michael Dumelle
Benjamin Duncan
Jessilyn Dunn
Armelle Duston
Hannah Epperson
Sara Espinosa Garcia
Subrina Farah
Nathan Anton Fat
Shuaichuan Feng
Xinyang (Sean) Feng
Cade L. Ferguson
Hettige Kaveesha Kavindi
Fernando Fortin
Robert G. Fowler
Tianyi Fu
Cami Fuglsby
Kaiser Fung
Hubert Gagadosu
Miguel Galvez
Kyra Gan
Guozhi Gao
Jose Garcia
Michael S. Gates
Grace Gaultier
Hanna Gebremichael
Amanda Gehringer
Ariana GHahari
Mohammed Gharaibeh
Durbadal Ghosh
Tara Gladwell
Oriella Gnarra
Isaiah Grayam
Brian Greene
Atiba D. Griffith
Jenny Grissom
Zhixuan Guan
Subharup Guha
Tanay Gulwadi
David Gunderman
Tina Gunderson
Wenchuan Guo
Xinzhou Guo
Ross Hallren
Dae Woong Ham
Christopher Harshaw
Nathan D. Hawkins
Lauren E. Haydu
Shai He
Emily Hennessy
Raymond Holland
Cynthia D. Hollingsworth
Narimon Honarpour
Sarah B. Horine
Wei Hou
Ya-Ching Matilda Hsieh
Jing Hu
Jingwen Hu
Rui Hu
Angelinabella Huff
Kai Hung
Sara Hunsberger
Lingfeng Huo
Bradley Hupf
Muhammad Husain
Curtis Huttenhower
Dong Min Hwang
Jihae Hyun
Osayimwense Izinyon
Eugenie Jackson
Riedel Jacobis
Joohye Jeong
Fei Jiang
Yi Jiang
Hanxiao Jing
Ali Kaazempur-Mofrad
Pavel Karasek
Kimberly Kaufeld
Oluwatobiloba Kazeem
Sheraz Khan
Juyoung Kim
Soeun Kim
Carine Klauberg
Shengchun Kong
Jeffrey J. Kopicko
Michael Kratzer
David Kremelberg
Michael S. Lachanski
Waverly Langston
Horace Lawrence
Jimin Lee
Murray Lei
Martin S. Levy
Helena Li
Kevin Y. Li
Lihua Li
Qinghua Li
Ray Li
Xin Li
Yuntong Li
Dawei Liang
Lena Liang
Zhongyuan Liang
Wenyi Lin
Guohui Liu
Jiaming Liu
Jiawei Liu
Shelley Liu
Siyi Liu
Xialu Liu
Xinran Liu
Yunting Liu
James Livsey
Cassandra A. Logan
Nancy Lopez
Chenyu Lou
Haolan Lu
Kevin Lubin
Ariel Shmuel Lutati
Nicole Luthcke
Guysnove Lutumba
Maxwell Kwesi Mac-Ocloo
Federico Ernesto Macchiavelli
Eric A. Macklin
Samantha Magid
Naresh Kumar
Mallenahalli Kiran Kumar
Mandula Samuel
Kaylena Mann
Xuejing Mao
Dobrin Marchev
Denka Markova
Steve Mathew
Kaatje A. Matthews-vanKoetsveld
Cynthia Vinson McShea
Rebecca Medlin
Zora Mei
Omar Melikechi
Austin M. Menger
Chapin Meny
Karen Messer
Candace Metoyer
Mason Miller
Sunil Mistry
Akshata Kishore
Moharir George Mohler
Dominique Monserrat
Sydney Montgomery
Kari Morita
Brian Mosier
Marat Mullagaliev
Sundar Natarajan
Aaron H. Niecestro
Ina Uswatun Nihaya
Francis K. Nkansah
Mei-An Nolan
Abraham Nsiah
Julia C. O'Neill
Ryo Okano
Guilherme Lopes Oliveira
Daniel Oluwafemi Olofin
Ziyi Ou
Jianan Pan
Dimitri Papadimitriou
Shinyoo Park
Soyoun Park
Laura Patane
Daniel Paydarfar
Sano Peng
Sudhakara Peram
Kenzie DeHaven Potter
Hunter J. Privett
Luke Purcell
Syaifurrizal Wijaya Putra
Waveley YuQing Qiu
Pranatha Rao
Pradipta R. Ray
April Ren
Zexin Ren
Jessica Reno
Homa Rezaei
David Riegert
Jeffrey Wallace Rieske
Douglas Rivers
Gloria Robertson
Ian T. Robinson
Taylor J. Robinson
Peifeng Ruan
Flori Rueda-McCaffery
Keisner Ruiz
Ramdhan Russell
Farima Sadeghi
Natasha Sahr
Mina Salarzadeh
Thabo Samakhoana
Sevastian Sanchez
Venkata Prasad Sandu
James Rosales Sario
Spencer Scanlan
Lindsey Schader
Jared Schettler
Sophia Schieltz
Jacob Seedorff
Lina Shaheed
Faraneh Shamserad
Nong Shang
Skyler Shapiro
Mukunda Sharma
Adnan Sheikh
Biyi Shen
Yaru Shi
Carlos Alberto Silva
Adina Silverstein
Liz Simmons
Ravinder Singh
Anubhav Nikunj Singh Sachan
Hiywete Solomon
Jingya Song
Andrea O. Stancescu
David Walter Jacques Stein
David Craig Stenning
Emily P. Stephen
John Stettler
John Q. Su
Nandita Subbiah
Jimeng Sun
Aparajita Sur
Chenwei Tang

Qing Tang
Tengjie Tang
Zhengzheng Tang
Lorraine Tawfik
Arda Terterian
Zachary Thomas
Bowen Tian
Viki Tolson
Yanwei Tong
Machell K. Town
Thomas G. Travison
Donald Turner
Nene Ukonu
Michael Ulis
Salil Vadhan
Jonathon Vallejo
Mark G. Vangel
Ravi Varadhan
Eric Vasquez
Michele Vaughn
Guilherme Veloso
Vaishnav Venkat
Isabella Verdinelli
Sujit J. Vettam
Jorge-Luis Villalba-Acevedo
Benjamin Vogel
Yari Volpe
Caitlin R. Waickman
Bokai Wang
Dongliang Wang
Hao Wang
Hao Wang
Haoyuan Wang
Jianming Wang
Ruixuan Wang
Shuai Wang
Songbai Wang
Suwei wang
Yixin Wang
Yu Wang
Yunqi Wang
Zebin Wang
Ian Waudby-Smith
Douglas Weatherhead
Haruka Onuma Whitcroft
Colin Edward Willard
Diana Williams
Daniela M. Witten
Alex Wittnebel
Edmund Wong
Fan Wu
Jing Wu
Michael K. Wu
Regina (Yixuan) Wu
Ruoxuan Wu
Yaqi Wu
Yuhan Wu
Zheyang Wu
Haonan Xiao
Yuxia Xie
Elena Xu
Mark Xu
Ziping Xu
Jiayi Xue
Aimin Yan
Justin Yan
Hongjian Yang
Lulu Yang
Qiaoshi Yang
Yuan Yang
Zhixian Yang
Zihan Yang
Jingyi Yao
Olena Yasinchuk
Yuxin Yin
Jeong Lim Yoon
Zhiping You
Bing Ui
Ming J. Yuan
Mason J. Yurich
Jiewei Zeng
Wentao Zhan
Boya Zhang
Hui Zhang
Jinchun Zhang
Lei Zhang
Qi Zhang
Shanshan Zhang
Weihan Zhang
Xisi Zhang
Ying Zhang
Yuxin Zhang
Zhaoqi Zhang
Zhewei Zhang
Mengting Zhao
Yixuan Zhao
Haotian Zheng
John Zhong
Wei Zhong
David A. Ziebart
Robin Zimmerman
Wanxue Zou
Jake Anthony Zummo ■

New Member Spotlight: BRIE COYNE


Illustration by Dolinemae

This month, we spotlight Brie Coyne, a biostatistics student who answered a few questions, so we could get to know her better.

How did you become interested in statistics and/or data science?

I have a very convoluted educational background. I started off as an English major who hated anything with numbers until I read *Love and Math* by Edward Frenkel. That book completely changed my view on math, and I switched majors almost immediately. In my sophomore year of college, one of the physics professors took me on as a student to use Maxwell's Equations to model a solar dynamo wave. I thought it was really cool how you could use math to predict the future, and my interest in mathematical modeling led me to statistics.

Unfortunately, I developed a disability that completely derailed my undergraduate studies. I switched majors from math to science communications, and I've been in some form of writing-adjacent job since. However, now that I've gotten the disability under control again, I've enrolled in graduate school. I'm finishing up a certificate in epidemiology, and now, I'm applying to biostatistics programs.

What do you consider your dream job?

Anything that lets me use my love of math, statistics, and coding to further human welfare.

What do you hope understanding statistics and/or data science helps you accomplish?

My sister and I have the same disability, but her outcome was much worse. I'm hoping that by becoming a biostatistician, I can meaningfully contribute to research that predicts and prevents negative health outcomes (particularly with psychiatric disabilities).

Is there a particular group of statisticians you would like to reach out to you?

I'd love to connect with others interested in mental health or statistical epidemiology.

What is your favorite hobby?

I make content for video games! I usually make quests and design levels/environments. It's a very collaborative hobby and a great way to meet new people with common interests.

This Month in Statistics History:
How Statistical Evidence Transformed Patient Safety

Penny S. Reynolds

The World Patient Safety Day on September 17 was established by the World Health Organization in 2019. This month, we celebrate a few of the many statisticians and physicians who pioneered the use of quantitative evidence and statistical methods for identifying preventable patient harms.

1840: James McCune Smith was the first African American to earn a medical degree and was a founding member of the New York Statistical Society. In 1840, he published a series of articles in a leading medical journal demonstrating that silver nitrate treatments for sexually transmitted disease in women were ineffective and harmful. Later, he used statistical arguments to debunk bogus and pseudoscientific medical practices such as phenology and the "lay puffery" of homeopathy.

James McCune Smith

1860: At the fourth International Statistical Congress in London, long-term collaborators Florence Nightingale and William Farr presented a groundbreaking proposal for standardizing hospital statistics, establishing a foundational framework for modern hospital quality improvement and patient safety and identifying corrective actions for reducing harm to patients and healthcare providers. Their clarification and systematic accounting of competing risks of recovery and death were major conceptual breakthroughs.

1861: Handwashing was the most effective protection against hospital-acquired infections, which was still a significant patient safety concern. Using the "numerical method," advocated by Pierre Charles Alexandre Louis, Ignaz Semmelweis published a quantitative comparison of mortality rates between two maternity wards at Vienna General Hospital. He showed that maternal deaths from puerperal (child bed) fever dropped dramatically from 18% to under 2% after stringent handwashing protocols were introduced. His attempts at reform did not go well: His findings were rejected by the medical establishment, and he lost his job and died in a mental institution. However, since then, handwashing has saved millions of lives.

1904: Karl Pearson introduced the first clinical meta-analysis of observational data. He compared rates of typhoid infection and mortality in vaccinated and unvaccinated soldiers. He provided a pooled estimate of effect in the last line of the tabulated results.

1935: Louis Isaac Dublin, chief statistician and vice president of the Metropolitan Life Insurance Company, went public with a shocking exposé of US maternal mortality rates. Arguing that maternal mortality was a preventable public health failure driven primarily by economic disparities, he advocated for practical reforms such as universal routine prenatal care and subsidized maternal clinics, providing affordable access to qualified care. In 1938, he announced "the tide has turned," but almost a century later, US maternal mortality is still the highest among developed nations.

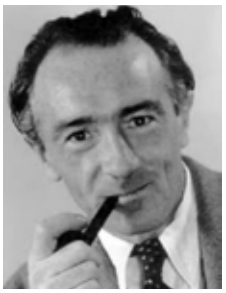
Louis Isaac Dublin

1954: Peter Armitage published the first comprehensive paper on the application of sequential analysis to clinical trials. Sequential analysis enabled statistically valid interim analyses of accumulating trial data to decide whether a trial should stop early for benefit, harm, or futility. This development minimized unnecessary patient exposure to ineffective or harmful treatments while maintaining the statistical integrity of the trial.

1969: The National Halothane Study was the first major collaboration between statisticians, computer scientists, and physicians—and one of the first

to use mainframe computers to process big data. The study assessed more than 865,000 patient records across 34 hospitals to evaluate the claim that the anesthetic agent halothane was associated with post-operative liver failure and patient deaths. Frederick Mosteller coordinated the distinguished team of statisticians: John Tukey, Lincoln E. Moses, Stephen E. Fienberg, Yvonne Bishop, Byron M. Brown Jr., and John P. Gilbert, along with computer scientists W. Morven Gentleman, Joseph Halpern, and Lawrence G. Tesler. Innovative and improved statistical applications developed by the team included multivariate log-linear models, hospital ranking and case-mix adjustment methods, robust estimation, and exploratory data analysis. Although the study did not find an association between halothane and liver injury, it did uncover an alarming 24-fold difference in death rates among different hospitals that could not be explained by differences in case mix or anesthetic agent.

1972: In his book *Effectiveness and Efficiency*, physician Archie Cochrane argued that medical practice should be grounded in evidence from well-designed, randomized controlled trials and regularly updated systematic reviews—rather than depending on individual studies, narrative reviews, tradition, or opinion. The Cochrane Collaboration was established in 1993 as a centralized repository for high-quality, systematically synthesized medical evidence.



Archie Cochrane

1976: Gene V. Glass coined the term meta-analysis, defined as "the statistical analysis of a large collection of analysis results from individual studies for the purpose of integrating the findings." Karl Pearson, Ronald A. Fisher, and William G. Cochran had already developed the basic methodology, with further advances in inference and effect-size estimation made by Ingram Olkin, Larry V. Hedges, and Sir Richard Peto. Clinical researchers, such as Thomas C. Chalmers and Iain Chalmers, demonstrated the importance of meta-analysis and high-quality systematic reviews for improving patient care and reducing avoidable patient deaths.

1978: An early version of a forest plot was published. It summarized results for 71 "negative" randomized controlled trials, using modified boxplots to show trial-specific effect sizes and respective confidence intervals. In 1982, the first modern forest plot appeared in a formal meta-analysis evaluating beta-blockers for reducing post-heart-attack mortality. In 1983, the signature forest plot "look" emerged, with point estimates represented by squares and confidence intervals by lines. In 1992, Thomas C. Chalmers and Fred Mosteller introduced the cumulative forest plot. Because it updated effect size as trial results were added, a cumulative meta-analysis revealed gaps between clinical guidelines and definitive evidence, capitalizing on accumulated evidence for either benefit or harm. A dramatic demonstration of the human cost of overlooked evidence was the 2005 retrospective meta-analysis of the association of infant sleeping position and risk of sudden infant death syndrome. Epidemiologist Ruth Gilbert and colleagues showed that robust evidence linking prone sleeping position to a threefold increased risk of SIDS already existed by 1970—24 years before the Back to Sleep campaign was launched. The failure to systematically synthesize available evidence contributed to more than 50,000 preventable infant deaths worldwide.

Fred Mosteller

MORE ONLINE
For more information, download the references at *https://tinyurl.com/35n3b75x*.

1998: The Bristol Royal Infirmary Public Inquiry launched to investigate unusually high mortality rates of infants undergoing complex cardiac surgery between 1984 and 1995. Sir David Spiegelhalter and colleagues used risk-adjusted mortality analysis, random-effects hierarchical modeling, case-mix adjustment, and sensitivity analyses to compare outcomes across 12 UK pediatric cardiac centers. Their analyses showed that Bristol was a true statistical outlier: Mortality rates were almost double those of comparable UK centers, leading to many avoidable deaths. The inquiry revealed system failures in outcomes monitoring, clinical governance, organizational culture, and accountability. It also determined that routine standardized statistical surveillance of clinical outcomes was essential for detecting unsafe practice. ■

Three leaders in statistics education—Patrick Hopfensperger, Jerry Moreno, and Henry Kranendonk—share their journeys, lessons learned and perspectives on preparing the next generation of learners. Their experiences spanning classrooms, curriculum development, and national initiatives offer valuable insights for educators at every stage.

Patrick Hopfensperger:

Bridging the Gap from State Standards to Teaching Statistical Thinking in the Classroom

Pat Hopfesperger

Patrick (Pat) Hopfensperger is a career mathematics and statistics educator at both the secondary and higher education levels. A former high school teacher at Homestead High School in Mequon, Wisconsin, he later became involved in teacher education at the University of Wisconsin–Milwaukee. Hopfensperger has been a national advocate for improving statistics education in K–12 classrooms and has served as chair of the ASA/NCTM Joint Committee on K–12 Education in Statistics and Probability. He was a lead contributor to *Bridging the Gap Between Common Core State Standards and Teaching Statistics,* an influential resource designed to help teachers incorporate statistical thinking and data analysis into classroom instruction. His work has focused on connecting mathematics, statistics, and real-world inquiry to help students become thoughtful consumers and producers of data.

We asked Hopfensperger the following questions to find out more about him and his involvement with statistics education.

JOURNEY AND INSPIRATION

What initially drew you to teaching? Did anyone inspire you? If so, who?

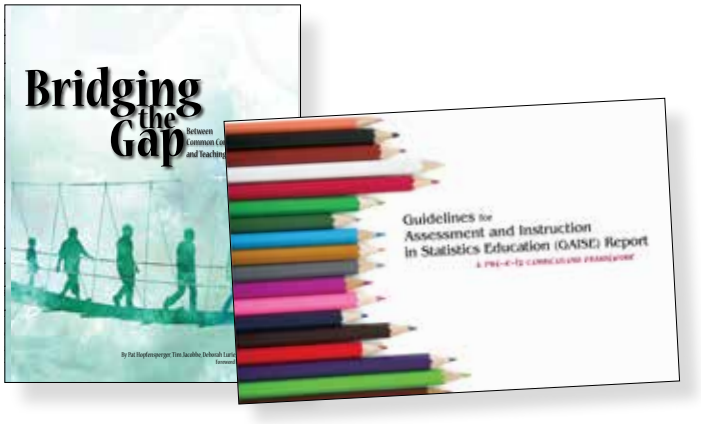
My dad and my high school mathematics teacher encouraged me to pursue teaching as a career.

When you began your career as a teacher, what did statistics education look like compared with today?

When I started in the early '70s, there was hardly any mention of statistics or probability in high school mathematics textbooks. There were a couple lessons on combinations and permutations and a few lessons on measures of central tendencies, but not much else. My high school did not have a statistics course. Now, middle and high school mathematics textbooks have incorporated stats and probability into their curricula, and many high schools have dedicated statistics courses, both AP and non-AP

How did the GAISE recommendations change the conversation around teaching statistics?

I believe it helped state departments of education begin to focus on the importance of statistics education. Curriculum



Selected publications featuring contributions from Patrick Hopfensperger

writers now had a guideline to follow as they developed material, and local school districts now had a blueprint they could use to incorporate statistics into their existing mathematics curricula.

LEGACY AND PHILOSOPHY

What inspired the creation of resources such as Bridging the Gap and other classroom materials you authored?

After *GAISE* came out, it became apparent there was a clear lack of quality lessons available that elementary, middle, and high school teachers could use to implement statistical thinking into their mathematics curricula. We wanted to showcase lessons that encouraged teachers to have students collect data and draw conclusions.

How would you describe your teaching philosophy? Can you give us one or two principles?

Actively involve students in their own learning, and use the resources available, like technology, to enhance their understanding of the concepts.

Was there a particular student, classroom experience, or project that reinforced why you chose a career in education?

As math educators, we have all heard the phrase, "Where am I ever going to use this stuff?" I recall a senior in high school who was in my non-AP stat course. This course was designed for seniors who were struggling in mathematics and needed an alternative to pre-calculus. Shortly after the semester started, this senior stopped by after class and said this was the first time he could see where he would use math in his life.

REFLECTIONS AND ADVICE

What skills will students need in an increasingly data-driven world?

Students should understand that statistical analysis is an investigative process. They need to understand how to formulate a question that can be answered with data, design a plan to collect the data, analyze the data both graphical and numerically, and interpret the data to answer the original question.

Students should understand that statistical analysis is an investigative process.

In addition to these steps, students need to question how the data was collected and what techniques were used to analyze the data.

What excites you most about the future of statistics education?

Statistics education at all levels is much more prevalent. Statistics and probability are no longer just additional lessons. I see more students being actively involved in the collection and analysis of data.

What advice would you give educators who want to make statistics more engaging and relevant to students?

Involve your students in collecting the data, use technology to help in the analysis of the data, and encourage the use of simulations to help in the development of statistical concepts like inference. ■

Jerry Moreno:
An Architect of Modern Statistics Education

Jerry Moreno's career reflects a lifelong commitment to teaching mathematics and statistics, with a strong focus on inspiring future educators. After earning his bachelor's degree in mathematics from Lehigh University and a master's in probability and statistics from Michigan State University, he began teaching at John Carroll University in 1968 and remained for four decades. Throughout his career, he became known for his energetic and creative teaching style, often using engaging examples to help students connect with and enjoy mathematics and statistics. A central part of his teaching was preparing future elementary educators. This is where he undertook the mission of transforming how math is taught in schools and helping his students bring that vision into their own classrooms.

Jerry Moreno

Beyond the classroom, Moreno played a significant role in advancing statistics education at both the university and national levels. He co-chaired university efforts to improve teaching, helped establish centers focused on teaching excellence and STEM education, and was deeply involved in K–12 mathematics reform efforts. He served as editor of the *Statistics Teacher Network*, launched the ASA Statistics Poster Competition to promote statistical thinking among students, and worked with national organizations, such as the ASA and National Council of Teachers of Mathematics, to integrate statistics into school curricula. His contributions were widely recognized, including receiving teaching excellence awards, becoming a fellow of the American Statistical Association, and earning the ASA Founders Award. He also served his local community on a school board, further extending his impact on education beyond higher education.

We asked him the following questions to find out more about him, his career journey, and his teaching philosophy.

JOURNEY AND INSPIRATION

What initially drew you to teaching? Did anyone inspire you? If so, who?

My dad was a professor of languages at Washington and Jefferson College. So, I suppose if teaching is genetic, the writing was already on the wall. Teaching was in my genes.

There were many teachers and professors whom I admired, but one who especially stands out was my fourth-grade teacher, Mrs. Crites. She had a passion for mathematics that rubbed off on me. Although her homework assignments were more rote than the deep problem-solving tasks we emphasize today, I loved the work she gave us at the time. More importantly, she took a genuine interest in me, which motivated me to work even harder.

You describe your move into statistics as somewhat unexpected—what made you "fall in love" with the subject once you encountered it?

I went to Lehigh University dreaming of becoming the best electrical engineer on Earth. That dream lasted hardly a semester. As I developed a stronger interest in mathematics, I pursued it as my major. But as graduation approached and I prepared to attend Michigan State University, I began questioning whether becoming a mathematician was really the right path for me.

One of my professors at Lehigh, Jerry King, suggested that I look up a statistics professor friend of his at Michigan State, Jim Stapleton. I did, and I have been forever thankful for that advice.

What immediately intrigued me about statistics was its relevance in the real world and

its application to an enormous range of fields. I think many people are drawn to statistics for those same reasons.

IMPACT ON STATISTICS EDUCATION

What changes have you seen in how statistics is taught in schools since you first began advocating for it?

Oh my, so much has changed since the 1980s in statistics education, both at the school and college levels. In general, instruction and materials have shifted from rote calculation of formulas with little context to a focus on statistical thinking, data visualization, interpretation, and real-world applications.

I will comment mainly on the school level.

A major influence on statistics education in schools was the creation of the ASA/NCTM Joint Committee on Curriculum in Statistics and Probability for Grades K–12 by Fred Mosteller. During the 1980s, its members played a major role in shaping the *NCTM Curriculum and Evaluation Standards for School Mathematics* (1989), the first widely recognized, comprehensive national standards framework for school mathematics in the modern standards-based era. Thanks to those ASA members and schoolteachers who worked on the document, statistics and probability became one of the curriculum standards for all grades, K–12. This opened the door for many of us to start advocating for statistics in schools.

The joint committee also produced early curriculum materials such as *Statistics by Example* and *Statistics: A Guide to the Unknown.* These publications introduced authentic data and practical statistical reasoning to school curricula. In the early 1990s, the four books of the Quantitative Literacy Project followed, providing classroom-ready materials that many of us used in workshops to help teachers learn what and how to teach statistics.

A decade later, the first edition of the *Guidelines for Assessment and Instruction in Statistics Education* was published, which emphasized a framework for statistical investigation, data analysis, and statistical thinking across grade levels. Many statistics educators who conducted workshops on modern approaches to teaching statistics also used *GAISE* to inform curriculum developers at the state level. *GAISE II,* published in 2020, continues to provide an excellent foundation for statistics instruction in schools.

To encourage students to apply their knowledge of statistics in creative and investigative ways, the joint committee created the ASA Project Competition in 1987 for grades 7–12 and the ASA Poster Competition in 1989 for all grades. To continue influencing lesson plans, classroom activities, professional development resources, and technology tools for teaching statistics, the joint committee created the online journal *Statistics Teacher.*

Although the joint committee did not create AP Statistics, I must mention that Dick Scheaffer (who served on the joint committee) was one of the major statisticians involved in its creation. He chaired the AP Statistics Task Force established by the College Board to develop the curriculum for the course. He also served as its first chief reader and co-authored important course materials.

I was fortunate to have been a member of the joint committee for many years. Without a doubt, those were the most productive and enjoyable years of my committee life. Overall, the ASA/NCTM Joint Committee helped transform statistics from a minor mathematics topic based on formulas into a major component of K–12 education centered on real data, investigation, reasoning, and informed decision-making.

MENTORSHIP AND LEGACY

What advice would you give educators who want to be strong mentors to their students?

To be a strong mentor, you must have a solid understanding of your subject and a desire to continue to learn and improve. And being a mentor requires you to be student-centered. You must listen carefully to students, be willing to understand their struggles, and instill confidence in their ability to succeed. You must also recognize that students learn in different ways and that you need to be willing to adjust your teaching accordingly.

What advice would you give students who want to become educators in mathematics or statistics?

I would encourage them to focus on ideas, not rote procedures. Although it can be tempting to rely on mnemonics to remember certain concepts, especially in mathematics, they should instead strive for genuine understanding, ask good questions, and connect ideas to real life. Don't be afraid of making mistakes. Mistakes create opportunities for both teaching and learning. I would also encourage them not to let technology replace understanding. And when they become teachers, they should respect every student and recognize that they learn in different ways and at different rates.

Above all, I would encourage them to model the innovative teachers who first inspired them to love learning and teaching mathematics and/or statistics. ■

MORE ONLINE
Read the complete interview at *https://magazine.amstat.org*

Henry Kranendonk
on the Purpose and Process of Teaching Statistics

Henry Kranendonk is a mathematics educator, curriculum developer, and former mathematics curriculum specialist for Milwaukee Public Schools. In a career spanning more than four decades, he's been a classroom teacher, teacher educator, curriculum writer, and mathematics specialist with the Marquette University Educational Opportunity Program. Kranendonk has authored numerous mathematics textbooks and instructional resources, including the Data-Driven Mathematics series, and has contributed to mathematics education initiatives at the local, national, and international levels.


Henry Kranendonk

We asked him the following questions to find out more about him, his broad career path, and his work in both K–12 education and teacher preparation.

JOURNEY AND INSPIRATION

What initially drew you to teaching? Did anyone inspire you? If so, who?

I have two older sisters. As I was growing up, my oldest sister was a teacher in a one-room rural school in my hometown of Oostburg, Wisconsin. I was six at the time. I recall she would bring home stacks of papers to correct with a red pen. I thought that was so neat! I watched her as she marked papers and organized her daily presentations. To keep me busy, she gave me a red pen and some discarded papers to pretend I was correcting. I was in my glory! My sister and her dedication to teaching were an inspiration.

My younger sister, who is 10 years older than I am, entered college when I was seven with the goal of teaching high school math. Unfortunately, she lacked the courage to speak in front of people, so she practiced with me. She pretended she was a teacher and I was a high school math student. So, for several years, I learned high school math through her "lectures"—and loved it. By the time I reached high school, most of the math classes addressed what she taught me. Years later, she completed her college studies in computer science. She became a programmer, and I became the math teacher.

In (maybe) 1963, I was selected to be in a special math class of eighth-graders. The math curriculum was radically changing due to the connection of number systems to computers. I recall working with base 16 and base 2 as major topics and skills. My teacher was very frustrated as he tried to explain it! My memory is that he got lost in the details of why this was important. I thought the connections to emerging work with computers were exciting. As a result, for several months, I was the teacher of the class. My friends said I explained the material well, and yes, that also inspired me to be a teacher.

The work with my sisters and my eighth-grade school teaching combined to help me develop my early interest in teaching math. I entered college and knew from day one that teaching high school math was my goal. I never really considered any other option.

Your early career focused on mathematics and computer science. How did statistics become a significant part of your professional work?

In 1980, I accepted a teaching position at Rufus King High School in Milwaukee. The school had just received acceptance in the International Baccalaureate program. Similar to AP, but with a European focus, the school also wanted to offer a new course called IB Computing Studies. I had experience teaching intro computer courses during my time at Carroll College. The IB coordinator asked if I would teach this course—and of course, I was very excited to give it a try! It was an interesting time to teach computer-related

courses. To be honest, the guidelines for the course were very vague, thus I could pretty much do what I wanted. I decided to teach a programing language and to help students develop the key components of coding. The course I initially taught was essentially learning the BASIC programming language. (We later switched to Pascal.) I soon realized that simply teaching the structure of a computer language was not engaging to most students. As a result, I refocused the course on developing projects. Almost all the projects were connected to collecting data and writing programs to summarize the data. This led to an interest in statistics and probability, which I soon connected with my math classes. Most of the projects involved surveys. Students submitted topics of interest, and I had them write the survey, collect completed surveys, and begin analysis of collected data. The students then wrote the code to graph and summarize the data. Topics explored were often related to the school environment, issues about preparation for college, the physical plant of the school, asthma, generations, and teenage challenges in life. Students were very excited to present their results. I organized a "press conference" to conclude the project, in which students summarized their results for news media, school board, parents, community members, and political leaders.

The course evolved into IB Computer Science, and for 20 years, I served as the senior teacher for the course. The IB organizing committee in New York City selected me for this position. During several summers, the New York office sent me to schools across the country and world (Egypt, Germany, and Canada) to assist them as they developed the course. The goal was to structure a genuine data analysis computer science course. I assisted in writing the curriculum for the course and expanding its outreach. For most of my time as senior teacher, I also served as the assistant examiner for this course and worked with other teachers across the country to develop statistical projects and computer science objectives.

LEGACY AND PHILOSOPHY

You've authored and co-authored several textbooks including* People Count *and* Making Sense of Statistical Studies. *What gap in statistics education were you hoping to address through these materials?

My projects and books were all connected to what I define as "modeling" with data. Teachers are driven to teach skills and to ensure students can apply them at the next level of learning. I agree with that, but there must also be an equal focus on the purpose and relevance of what students are learning. Modeling has many definitions, but for teachers of statistics, I favor one that develops students' ability to ask and answer "what if" questions. What if the parameters of the investigated problem change? What if the story of the investigation alters? Behind most statistical questions are structures that provide students a chance to alter the question and discover how those changes influence the outcomes. Understanding these structures is the first step in my definition of modeling.

In *Making Sense of Statistical Studies,* for example, Roxy Peck and I developed a lesson around the question, "Are teenagers responsible?" Students designed a survey, collected data from their school community, and analyzed the results. The project naturally led to additional questions: Would students in another country respond differently? What might explain any differences? For me, that process of extending a statistical investigation through new questions is the essence of modeling with data.

REFLECTIONS AND ADVICE

What changes have you seen in how statistics is taught in schools since you first began teaching?

My first experiences of teaching statistics involved a lot of paper and pencil computations (1970s). Clearly, the development of technology in hardware and software was a major factor. But, the primary function of what is behind statistics did not change during that time. The study of samples, sampling distributions, connections to significance, hypothesis testing, etc., did not radically change. I think we are living in a complex time in which our definitions of statistics, mathematics, and data science are changing—and we don't know where it's going! To some extent, these disciplines are trying to prove why they are important. AI is conveying that it can handle a lot of what is in this discipline, so skip teaching it. I have strong opinions on this matter, and I hope we can bring out the "human element" in our study. It will be a challenge!

What is the human element? Obviously, my summary would take a lot of space, and I'm still thinking about much of it. I hope we continue to challenge ourselves and teach our disciplines with a connection to modeling and questioning. The questions we raise may be answered by AI interventions, but I don't think they'll encompass the entire range of "significant" questions we need to address. ■

MORE ONLINE
Read the complete interview at *https://magazine.amstat.org.*

2026 Guidelines for Assessment and Instruction in Statistics and Data Science Education (GAISE) College Report Set for Launch

Donna Lalonde, ASA Associate Executive Director

"Teaching Statistics: More Data, Less Lecturing" is the title of an article written by George Cobb and published in a 1992 issue of *Amstat News*. Cobb's approach to statistics education was foundational in the development of the American Statistical Association's *2005 Guidelines for Assessment and Instruction in Statistics Education (GAISE) College Report*. Both the 2005 and 2016 reports included goals, recommendations, and examples of activities; assessment items; technology use; and real data. The *2026 GAISE College Report,* which will be officially launched later in the fall, will support current teachers of introductory statistics and introductory data science as they follow Cobb's advice—more data, less lecturing. The revision effort was led by Dave Hunter, Lisa Kay, Donna LaLonde, Patti Frazer Lock (co-chair), Chris Malone, Jamie Perrett (co-chair), and Maria Tackett, with input from the statistics and data science education community.

Evolving alongside modern educational needs, the latest revision delivers expanded recommendations, assessment items, introductory statistics outcomes, and new data science guidance within an easily navigable website. Notably, it introduces course-level student learning outcomes that define what students should know and be able to do upon completing an introductory statistics course.

The new *GAISE College Report* can be found at *https://asacollegegaise.org*.

While retaining the familiar *GAISE* acronym, the report's official name is changing to the *Guidelines for Assessment and Instruction in Statistics and Data Science Education*, noting the addition of data science to the report. The *GAISE College Report* includes the following 10 recommendations for statistics and data science:

1. Teach statistics and data science as processes of gleaning insights from data to inform evidence-based decisions.
2. Emphasize effective written and oral communication of results from data, with attention to the scope and limitations of conclusions.
3. Focus on conceptual understanding rather than algebraic manipulation and formulas.
4. Integrate real data with a context and purpose throughout the course. Select data that is meaningful and engaging to the students.
5. Encourage multivariable thinking.
6. Incorporate software/apps to explore concepts and work with data.
7. Emphasize responsible and ethical conduct in the collection and use of data and its analysis.
8. Employ evidence-based pedagogies that actively engage students in the learning process.
9. Use a variety of formative and summative assessments to improve teaching and learning.
10. Implement inclusive strategies that create learning environments in which all students are valued.

The new *GAISE College Report* includes descriptions of each recommendation, along with additional discussion to help readers understand its intent and rationale.

Take time to dive into the expanded guidance and curated materials throughout the site. Whether refining an existing syllabus or designing a new course, you will find practical resources to enrich your teaching.

As a dynamic web resource, these guidelines can now evolve and adapt to the fast-moving educational landscape. This format will help educators navigate emerging technologies and ensure the curriculum remains forward-looking and relevant. ■

Statistical Education of Teachers (SET) II Charts a Course for Teaching Statistics and Data

Donna Lalonde, ASA Associate Executive Director

A new American Statistical Association report on the way this year aims to answer the question, "What exactly should a pre-K–12 teacher know to teach statistics and data well?"

Statistical (and Data) Education of Teachers (SET) II is a comprehensive framework for preparing teachers at every grade level, across every subject that touches data, to teach statistics and data education with confidence. Following the original *SET* report published in 2015, *SET II* addresses the evolution of school-level statistics and data education over the 11 years. The report is in its final stages and will be released soon.

Data now shows up everywhere in the K–12 curriculum. Science standards lean on statistical reasoning to build evidence-based thinking. Social studies standards ask students to interpret data about civic and economic life. Yet mathematics courses still carry most of the responsibility for teaching students to collect, analyze, and draw conclusions from data.

That imbalance makes teacher preparation difficult. In many states, elementary teachers are certified as generalists and may teach data concepts in any subject. Secondary teachers are certified as specialists, and the statistical depth they need varies by subject. Combine that with widely varying teacher-preparation program structures and it's easy to see why there is a need for clear guidance on what teachers need to know.

The *SET II* report organizes teacher preparation around three interlocking pillars: the content students need to learn; the subject-matter expertise teachers themselves need; and the teaching practices that make that content land in the classroom. The framework draws on research into Statistical Knowledge for Teaching, which separates the subject knowledge and pedagogical knowledge teachers draw on simultaneously in the classroom.

From there, the report builds out several practical components:

- **Seven cross-cutting big ideas:** Foundational concepts from the statistical problem-solving process to statistical habits of mind that apply across every grade band and anchor teacher preparation at every level
- **A tiered outcomes framework:** Building on the ASA's *Pre-K–12 GAISE II* framework, *SET II* adds a parallel structure for teachers across three levels: A (elementary), B (middle), and C (secondary), spelling out what teachers need to know and do at each stage
- **Recommendations by career stage:** Specific guidance for initial teacher preparation at the elementary, middle, and high school levels, plus recommendations for continuous, career-long professional learning
- **Field-tested examples:** Eighteen examples of teacher preparation activities drawn from programs around the world, giving teacher educators concrete models to work from

SET II is written for teacher educators designing certification programs, administrators shaping professional development, policymakers setting standards, and teachers who want a clearer picture of what strong statistical teaching looks like. Because data touches every subject area, the report makes the case that this isn't only a math department concern. Teachers across the curriculum need to be equipped to help students work with data appropriately for their field.

The report also lands at a moment of growing national interest in K–12 data science, as state education agencies test new pathways into teaching and national bodies continue studying how data and computing competencies should be built into the K–12 experience. *SET II* is meant to give that momentum a research-grounded foundation.

The full report will include five chapters covering the motivation and framework, the seven big ideas, the tiered learning outcomes, detailed program recommendations, and the 18 illustrative examples, together forming a roadmap that teacher educators and administrators can use directly.

Watch for a webinar supporting the full release in the coming weeks. ■

DATA LITERACY EDUCATION: Why We Need More Than Technical Skills

Danijela Markovic and Oskar Kärcher

Danijela Markovic is a professor of quantitative methods at Osnabrück University of Applied Sciences in Germany.

Oskar Kärcher was an assistant professor of quantitative methods at Osnabrück University of Applied Sciences in Germany and is now working in business consultancy.

Ask most universities what data literacy means and you will get a list of technical skills such as collecting, preparing, and analyzing data. These things matter. But scroll through job postings requiring data skills and a different picture emerges. Employers are looking for skills such as agility, problem-solving under tight deadlines, prioritizing, creative thinking under pressure, collaborating within teams, and clearly communicating the story behind the numbers. These foundational skills are absent from most data science curricula.

There is an equally pressing challenge: the incredible variety of learners in the classroom. Students arrive with a wide range of experiences, backgrounds, interests, and commitments, and some struggle to focus due to sensory factors in the physical environment. Not everyone pursuing data science comes from a STEM background, and a one-size-fits-all approach to data literacy education can unintentionally shut out the very people who could benefit the most. When someone who does not feel comfortable with mathematics is told they need to learn a programming language before they can do anything meaningful with data, they might simply walk away. That is a loss for both students and organizations, which desperately need people who can understand the human context behind data.

Living Tree

The data literacy education framework we developed uses the metaphor of a living tree to capture how all its elements depend on each other. The soil is an inclusive environment that genuinely accommodates different backgrounds and personal traits of students such as motivators, learning styles, goals, and sensitivity. The roots symbolize foundational competence—the complex thinking skills that make everything else possible. The trunk represents teaching methods and tools. The branches are the specific competence areas: data collection, analysis, modeling, visualization, and storytelling.

Cut the roots and the tree dies. Poison the soil and nothing grows. It sounds obvious when stated this way, yet most curricula focus almost exclusively on the branches.

Solving real-world data problems requires, at its core, the right mindset. We focus on six key complex thinking dimensions: scientific; systems; computational; critical; creative; and ethical. We don't treat these as isolated categories. For example, a business management student who worked at an agricultural machinery plant was interested in modeling wheat yield. Our group discussions highlighted the need for a range of considerations such as scientific thinking (What other data are needed?), critical thinking (Where are potential biases?), and ethical thinking (Whose interests does this model serve?).

Experience First, Theory Second

As students, we were always taught the theory first and only rarely had the chance to apply it. As instructors, we do the opposite. We begin our class sessions with a real-world scenario, presenting a tangible data problem that we, or a prepared student, attempt to solve using our web application, STATY. Only then do we introduce the mathematical-statistical foundations of those algorithms. To encourage active learning, students then apply these algorithms independently or in groups using either their own or provided datasets. They face obstacles and make mistakes with real consequences, motivating them to understand the *why* behind the process.

STATY is a free, primarily Python-based open-source web app we designed to bridge the gap between theory and practice. Its intuitive interface guides users through the entire analytical workflow—from uploading raw data to training machine learning models—without requiring any programming. However, tools alone do not make learning happen.

Coaching, Not Just Teaching

Another pillar of our approach is coaching. This might sound like a buzzword, but we mean something specific. Rather than standing at the front of the room and delivering knowledge, we spend a significant portion of class time asking questions and helping students unstick themselves. Coaching sessions use structured questions and agile principles to help teams plan their projects, navigate disagreements, and stay adaptable when their original question turns out to be unanswerable with

the data they collected. Lectures are held online, which simplifies real-time progress monitoring through quizzes and the "secret chat" (anonymous questions via the online conferencing tool). To support focus, students can request breaks at any time.

(Directed) Autonomy in Practice

Imagine a business data science course with 20–25 master's management students, at most one or two of whom have any programming experience and virtually none with any predictive modeling experience beyond multiple linear regression. Over 14–15 weeks, roughly half the time is devoted to theory, while the rest is hands-on practice. Topics move from exploratory data analysis and feature engineering through various regression, classification, clustering, and text mining algorithms, with a brief dip into Python along the way.

Our summative assessment asks students to write two research papers: a group project and an individual one, each using self-collected data, with at least one working predictive model required across the two. They have complete autonomy in selecting software and can even opt for zero programming. Our goal is to empower them with options, not obligations. Regardless of the path they choose, the practical reality remains: Preparing the data itself usually takes up most of the allotted time.

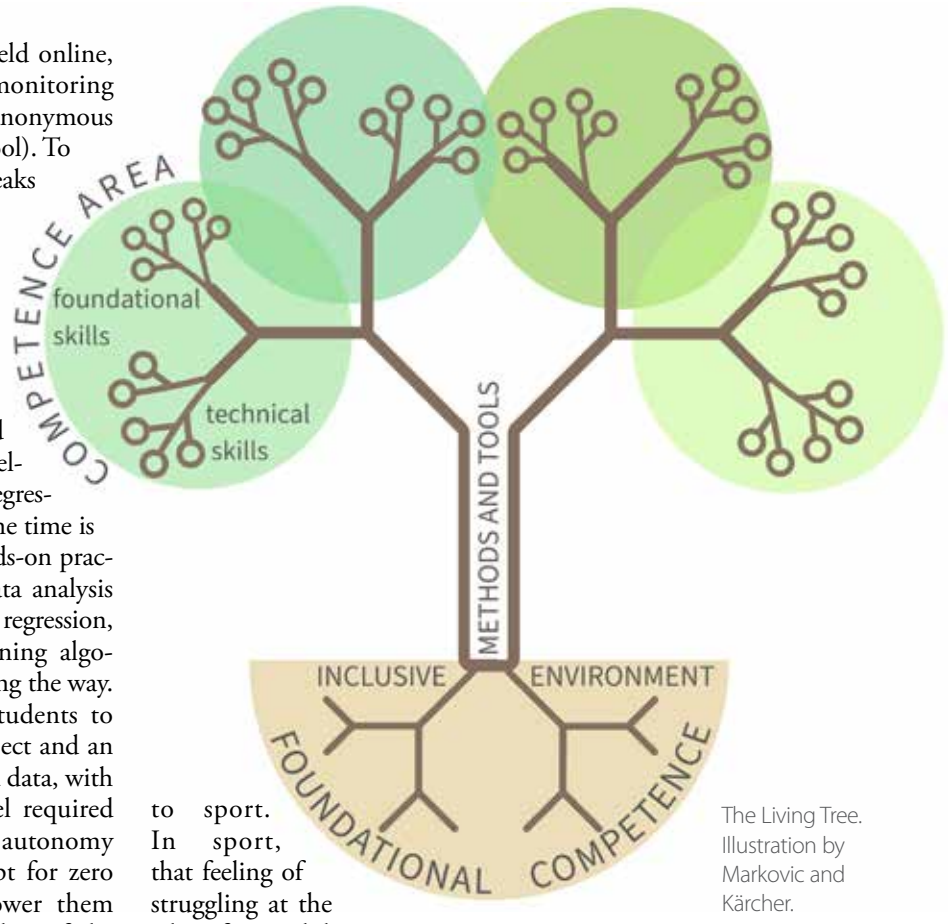
Across past cohorts, the depth of the students' work has exceeded our expectations. One student's individual paper even identified an error in a published scientific study, proving the value of rigorous, critical analysis.

What We Learned

Within the first application of our framework, not everything worked as planned. Even with a student teaching assistant available to help, setting up Python environments on personal computers was challenging. We have since moved to video tutorials and a portable version of STATY, and the difference has been dramatic.

Students also struggled with the freedom to choose their own datasets for group projects. We are therefore planning to offer curated datasets as an option for group projects, though not for individual ones.

The emotional dimension of this work is also real. Students regularly feel overwhelmed, especially when they encounter a concept that refuses to click on first contact. We started drawing an analogy to sport. In sport, that feeling of struggling at the edge of your ability is precisely where growth happens. Sitting with discomfort, rather than retreating, is a skill data professionals need as much as any technical ability.



The Living Tree. Illustration by Markovic and Kärcher.

Student software preferences revealed something we found genuinely interesting: Even when programming was required for the top grade, most preferred not to use it, although they all successfully completed in-class Python exercises. This appears to reflect how adults decide to allocate their limited time and energy, rather than being a failure of the curriculum. When given autonomy, people make pragmatic choices; our job is to ensure those choices are informed.

Beyond the Tree

Data literacy is rapidly becoming a civic skill, not just a professional one. Yet many data education efforts still concentrate their energy almost entirely on technical (digital) skills. Our experience is limited, but what we have seen so far suggests that, with the appropriate tools, the appropriate pedagogy, and genuine attention to who is sitting in the room and what they care about, it is possible to engage students from across the academic spectrum in serious, rigorous data work, thus enabling them to practice both technical and foundational data literacy skills. ■

MORE ONLINE

Read the full paper for details: *www.tandfonline.com/doi/full/10.1080/26939169.2026.2649248.*

Students' Statistical Thinking When Using Generative AI

Amos Jeng, University of Michigan, and
V. N. Vimal Rao, University of Illinois

Amos Jeng is a postdoctoral research fellow in the department of psychology at the University of Michigan. His research examines how learners seek help in technology-mediated environments, as well as how these behaviors are shaped by their identities, experiences, and cultures.

V. N. Vimal Rao is an educational psychologist and statistician who studies the psychology of statistics: What does it mean to 'do' statistics and how does one learn how to do statistics? Before completing his PhD at the University of Minnesota, Rao worked for both the US Census Bureau and the US Department of Health and Human Services as a senior statistician.

Generative AI technologies have changed the world. In education, some studies show positive effects of AI on students' learning, primarily via self-regulated learning strategies. The story is not all roses, however, as other studies note potential harmful effects of these technologies, including the risk that students offload their thinking to AI and subsequently fail to develop critical thinking skills.

One tool that has stood out to us in the landscape of generative AI workflows is Rtutor.AI, developed by Orditus. RTutor.AI is a web-based R Shiny app that translates plain-language statistical requests into R code using large language models. Unlike general-purpose AI tools (e.g., ChatGPT, Copilot, Gemini, or Claude), Rtutor.AI users type a prompt tantamount to pseudocode and receive executable R code together with its output.

This means users are unable to simply upload a dataset and ask Rtutor.AI to analyze it for them—Rtutor.AI's main function is to translate plain-language requests into R code, not to generate code for anything outside of that request. In other words, Rtutor.AI constrains the power of generative AI, forcing students to think about what they want to analyze and how the analysis should be done. In some ways, Rtutor.AI can be construed as a high-powered calculator.

We began incorporating Rtutor.AI into our courses in the spring 2024 term but have simultaneously worked to systematically study and evaluate its use in supporting statistics learning. To wit, we first set to capture an empirical trace of students' thinking when using Rtutor.AI. This first set of results, published in a recent *Journal of Statistics and Data Science Education* article, titled "Students' Statistical Thinking When Using Generative AI: A Descriptive Case Study," focuses on the following research question: What is students' statistical thinking when using Rtutor.AI to create and interpret multivariable scatterplots?

Key Findings

To answer these questions, we conducted a multiple descriptive case study in which five undergraduate students who had previously taken an introductory statistics course completed a graphing task with the help of Rtutor.AI. We gave each participant a dataset containing information about a sample of high school students' study hours, ACT scores, and school names across three high schools. The participants' task was to use Rtutor.AI to create a multivariable scatter plot with trendlines and interpret the visualization to recommend which high school a student should attend. During the task, we had participants voice their thoughts out loud to a member of the research team, which gave us insight into their statistical thinking. We then analyzed interview transcripts and data artifacts to extract common themes to describe students' statistical thinking.

Lowering Barriers to Completion of Statistical Tasks

Participants generally found that the intuitive nature of prompting with AI reduced technical and procedural barriers to statistical problem-solving, which allowed them to focus more easily on completing the graphing task. For example, one participant, Abi, emphasized how Rtutor.AI simplified the process of translating their statistical plan to a visualization:

> You have to be a little bit careful about how you say stuff, but for the most part, you can just tell it what you want it to do, and it'll do it.

However, Rtutor.AI does not completely abstain from automating key aspects of the graphing process, and in doing so may have also reduced opportunities for deeper engagement in statistical thinking compared to traditional programming tasks. For example, one participant, Bo, noted that Rtutor.AI did a lot of work on their behalf:

> It kind of gives me the elements, like hours spent preparing and ACT scores, without me asking, based on the dataset that we uploaded. And then it kind of gives me a key to what schools are recommended based on hours spent studying and their ACT score. … Yeah, it kind of did the first step for me.

This tradeoff between ease of use versus prerequisite thinking and planning is a key concern with the adoption of AI tools.

Prior Knowledge and Preferences Shaping Engagement with AI

Students' pre-existing statistical knowledge and graphing preferences shaped their engagement with Rtutor.AI. For example, Bennu structured

their first prompt around core graphing elements, including the graph, *x*-axis, and *y*-axis variables ("Create a multivariate scatter plot with *x*-axis as number of hours of studying and *y*-axis as ACT score."). When asked about this choice, Bennu explained that they had been taught to always start the graphing process by identifying the axes in this way:

> I feel like the first thing that you want to know is what data you're getting, and that is the *X* and the *Y*. So, for me, that's always been the first obvious step to look at and put on my piece of paper, my computer. … In my mind, that's what I've been conditioned, either by myself or by school, to do.

Thus, Bennu entered the task with a pre-existing understanding of the appropriate steps involved in graphing, and that understanding, in turn, shaped their structured approach to using Rtutor.AI.

In contrast, Bo did not frame their initial prompt around graph components; they simply asked Rtutor.AI to "create a multivariate scatterplot." When asked what they expected to see, they responded:

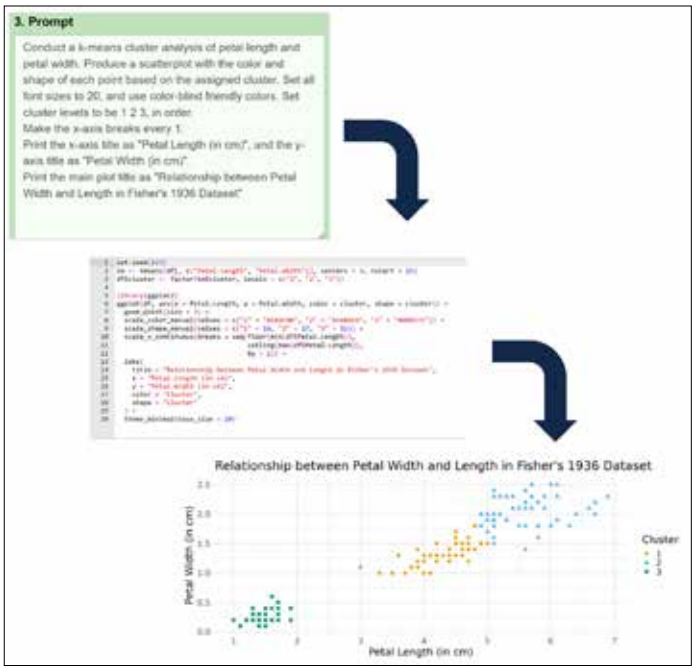
> I have no idea [what I'll see when I click submit]. Maybe just a scatterplot?

This suggests that because Bo entered the task with a less developed understanding of graphing conventions, they defaulted to a more open-ended, trial-and-error approach. While Bo was ultimately able to complete the task, it took them longer, and they spent a lot of time jogging their memory based on Rtutor.AI's output to figure out what to do and look for.

We think this finding highlights a strength of Rtutor.AI: It might still provide some output, but without a solid statistical understanding, students were unable to make informed statistical decisions. In effect, a lack of understanding turns Rtutor.AI into a fancy calculator. Without knowing how to use it and why, its usefulness diminishes.

Implications

How do these results help inform instructional choices about AI's incorporation into statistics and data science courses? Most importantly, we found students lacking a strong statistical understanding struggled to use Rtutor.AI to generate and interpret graphs effectively, demonstrating that Rtutor.AI could not completely compensate for this lack of prior statistical knowledge. We think this is a strength of Rtutor.AI compared to general-purpose AI tools; we do not want our students to be able to offload their statistical thinking to AI software tools.



Rtutor.AI constrains the power of generative AI, forcing students to think about what they want to analyze and how the analysis should be done.

Rtutor.AI Has Evolved

This study evaluated Rtutor.AI version 1.0. Since the research was conducted, the authors have collaborated with Orditus to redesign Rtutor.AI's workflow and features specifically for classroom use.

Learn more about Rtutor.AI at *https://rtutor.ai*.

For students with a solid baseline understanding of the statistical ideas at play (received from the normal course of instruction), Rtutor.AI supported continuous metacognition and self-reflection, in which students thought about whether the output generated by their prompts "made sense" and aligned with their goals and expectations. Even more so, the fact that it was prompts and not programming syntax might have facilitated students making connections between statistical concepts and vocabulary. Additionally, by lowering barriers to statistical problem-solving, Rtutor.AI allowed these students to spend more time focused on the graph and statistical implications of the results presented therein.

As educators, our choices regarding the incorporation of AI-based tools into our classrooms is not limited to a dichotomy. There is a middle ground in which we automate what we don't want our students to focus on, leaving more time for what we do want them to focus on. Doing so may strike an ideal balance to ensure our students focus on our key learning objective: critical thinking in a statistical world. ■

MORE ONLINE
Read the complete study in the *Journal of Statistics and Data Science Education* at *https://doi.org/10.1080/26939169.2025.2596684.*

What Students Taught Me About Teaching Statistics

Jaya M. Satagopan
Rutgers School of Public Health

Jaya M. Satagopan, professor of biostatistics at Rutgers School of Public Health and full member at Rutgers Cancer Institute, studies statistical genetics and genomics in cancer. She holds a PhD in statistics from the University of Wisconsin-Madison and an MSc in science communication and public engagement from the University of Edinburgh. She is also an ASA Fellow.

Every year, I prepare to teach biostatistics. Every year, I discover that I must also prepare to learn. The classroom is my laboratory, and teaching is my continuous experiment. Each semester provides new opportunities to observe, reflect on what works and what does not, and refine my approach to better support student learning. With each new semester, I return to the same questions: *What inspired students? Where did they struggle? What should I do differently this time?* These questions continue to shape my growth as an educator.

When I first began teaching, I introduced confidence intervals much the same way I had learned them decades earlier. I explained that a confidence interval for a population mean is the *sample mean* ± *margin of error,* discussed the formula for the margin of error, defined what a confidence interval represents, and worked through several examples. My students dutifully copied the formulas onto the cheat sheet they were allowed to bring to the exam and became proficient at the calculations. Yet many still could not explain what a confidence interval actually meant. They had procedural fluency—the "how"—but not the conceptual understanding—the "why."

The confidence interval example is just one manifestation of the broader lesson I was beginning to learn. I began to notice that, across many topics in statistics, students could often reproduce formulas correctly without fully understanding the concepts behind them. Once I realized this, it reinforced the importance of emphasizing conceptual understanding alongside procedural fluency, and it continues to shape my teaching. My goal has become to help students not only understand the concepts underlying statistical formulas, but also recognize those concepts when interpreting research articles, news stories, and reports.

Moving from Delivering Content to Developing Understanding

Initially, my focus was on covering the syllabus, addressing all the competencies, delivering polished lectures, ensuring students had opportunities to ask questions, and clarifying their doubts. I used in-class exercises to confirm students could perform statistical calculations and write appropriate interpretations of their results. For a while, I thought this approach was sufficient. However, my understanding of what students were learning in the classroom began to evolve as my interactions with them extended beyond the classroom.

Over time, I occasionally ran into former students who told me how they were using concepts from the course in other classes, research projects, and capstone experiences. Some returned to discuss their projects or sought guidance as they applied statistical methods to real-world questions. These conversations were rewarding. But they also prompted me to reflect more deeply: *Were my students simply applying the procedures they had learned, or were they developing the ability to think statistically? Was I emphasizing the "how" more than the "why" in my teaching?* These questions gradually shifted my focus from ensuring students could correctly perform statistical procedures to helping them understand the reasoning behind those procedures and recognize when and why to apply them. I also began to think intentionally about what students would retain long after the semester ended and apply years later. My goal became not only to teach statistical methods, but also to spark curiosity and help students think statistically.

Learning from Students

Students have become one of my greatest teachers. Through their questions, struggles, and successes, they have helped me recognize the gaps between what I thought I was teaching and what they were actually learning. One example that reinforced this lesson involved teaching the two-sample *t*-test midway through the semester. I explained that calculating the standard error of the difference between two sample means depends upon whether the population variances can be assumed to be equal. By this point in the course, students use computer output to conduct hypothesis tests and write scientifically appropriate interpretations of the results. Although the course emphasizes R, I sometimes use SPSS output because many students from allied disciplines initially find it more intuitive. Many students quickly learned the decision rule: If Levene's test for equality of variance was significant, use the second row of the output; otherwise, use the first. They became remarkably efficient at applying this rule. Yet, despite repeated reminders to read the entire output rather than focus on a single *p*-value, many could not explain why two rows existed or what assumptions distinguish them. This revealed a gap between what I intended students to understand about the two-sample *t*-test and what they had actually learned.

I changed my approach. Rather than emphasizing the statistical procedure, I decided to return students to the framework introduced in Week 1, when they learned how to formulate research questions and identify variables. I began asking students to start with the research question: What are we trying to learn? What variables are needed to answer the question? Which variable defines the two groups? What is being compared between the two groups? What assumptions are required before applying a statistical method? Only after working through these questions did we turn to the analysis and its output. I began applying this framework across statistical topics throughout the course, helping students see methods as tools for answering research questions rather than as isolated procedures.

Over time, conversations with students about their ongoing projects and capstone presentations became an important opportunity for me to learn whether the change worked. I noticed many students were becoming more comfortable explaining the rationale behind their analytical decisions and interpreting the results in the context of their research question. While this growth reflects the collective efforts of many instructors and mentors, the conversations reinforced my belief that helping students develop statistical thinking must be at the center of my teaching. Paying attention to how students reason helped me recognize whether my teaching was moving them toward statistical thinking.

Adapting to Today's Students

Improving statistical instruction is not a one-time task. Every cohort of students brings different experiences, strengths, and challenges. Every cohort also teaches me something new. The only constant in teaching is change. The challenges and opportunities facing educators continue to evolve. We are entering an era of artificial intelligence, when students have unprecedented and rapid access to information from multiple sources. The challenge is no longer in helping students find information. It is in helping them evaluate information, interpret evidence, and use statistical thinking to make informed decisions. This requires sustained engagement, deeper learning, and continuous adaptation from both students and educators.

At the same time, data and quantitative information are becoming increasingly ubiquitous, bringing students with a wide range of preparation, experience, and confidence in statistical methods. Each generation of students arrives with its own strengths and challenges. Effective teaching requires adapting to these changes while maintaining high expectations and standards.

Improving statistical instruction is not a one-time task. Every cohort of students brings different experiences, strengths, and challenges.

Good teaching adapts without lowering standards.

Building confidence is also an important part of good teaching. Many students approach statistics with uncertainty and anxiety, especially when they encounter unfamiliar quantitative concepts. By explaining why we use certain methods, creating opportunities for students to engage with real-world problems, and allowing them to see the relevance of statistics in practical scenarios, I aim to help students recognize that they are capable of thinking statistically.

The Experiment Continues

My own teaching continues to evolve. I have incorporated a flipped classroom approach and developed short instructional videos that students watch before class. In the classroom, I use newspaper articles, public reports, and peer-reviewed publications to help students connect statistical concepts with real-world questions. This approach allows me to spend more time helping students develop statistical thinking while building their confidence in interpreting statistical evidence and applying it to real-world decisions. I also emphasize critical evaluation of evidence, including vigilance about the quality and reliability of published findings. Through real-time activities, I encourage students to see statistics not as abstract methods, but as tools for understanding and addressing public health challenges.

Over the years, my students have taught me that effective teaching requires staying curious, listening carefully, and continuously refining my approach. Teaching is never finished. After multiple years in the classroom, I no longer measure success by how well I taught, but by how much my students learned—and by how much I learned alongside them. ■

You Don't Have to Have All the Answers

Building a Mentoring Community in Statistics and Data Science Education

Jackie Herman

Jacqueline (Jackie) Herman is a professor of statistics at Northern Kentucky University and chair of the ASA Section on Statistics and Data Science Education Mentoring Program Committee. Her interests include statistics education, mentoring, and helping students and educators develop statistical reasoning and communication skills.

There is something special about the beginning of a new academic year. Students are beginning a new chapter, faculty members are teaching new classes, graduate students are preparing for the job market, and many people are stepping into a classroom for the first time. It is a season full of fresh starts.

It is also the time of year when another group of mentoring relationships begins.

Over the past few years, I've come to believe everyone should have a mentor outside of their own institution. Having someone who has been where you are—someone who can listen, ask questions, and offer advice without it affecting your annual review or promotion process—is incredibly valuable. Those conversations usually start with a question about teaching, research, or the job market, but they frequently grow into lasting professional relationships, future collaborations, and friendships.

That's exactly what our mentoring program is designed to do. At its core, the idea is simple: connect statistics and data science educators with someone who has already navigated a similar path. Sometimes that means discussing teaching strategies, preparing for promotion and tenure, or exploring research ideas. Other times, it means talking through the academic job market or work-life balance, or simply having someone outside your department who will listen.

Over time, I've learned mentors don't have to have all the answers. They don't need to tell mentees exactly what to do, and they don't have to have experienced every situation themselves. Instead, they help mentees think through their options, ask good questions, and figure out what makes the most sense for their own goals and circumstances.

When I first became involved with the program, I assumed the biggest benefit would be the advice people received during the academic year. While that's true, I've realized there's something more valuable happening. Many of these mentoring relationships don't end when the official program ends in May. Participants continue meeting, collaborating, checking in with each other, and even becoming friends. Watching these relationships continue after the formal program ends has convinced me that we're building something much bigger than a mentoring program; we're building a community. That sense of community didn't happen overnight.

The mentoring program was founded by Nicholas Horton during his tenure as chair of the ASA Section on Statistics and Data Science Education. Inspired by the ASA Committee on Applied Statisticians' Mentoring in a Box initiative and similar efforts in other ASA sections, the goal was to create a mentoring program that would strengthen connections within the statistics and data science education community. The first cohort launched during the 2016–2017 academic year with approximately 12 mentor-mentee pairs.

What started as a small program has grown to around 45 mentor-mentee pairs each academic year. As the program has grown, it has also evolved to better serve the broader statistics and data science education community. Today, participants include graduate students, postdoctoral scholars, high school teachers, community college faculty, professors at both teaching-focused and research-intensive universities, and professionals working in industry. Beginning with the 2025–2026 academic year, we also removed the requirement that participants be members of the American Statistical Association, making the program accessible to an even broader community.

While the idea behind the program is simple, putting together successful mentoring pairs takes more than matching names. Every summer, two committee members and I carefully read through each application before making matches. We look at where mentees are in their careers, what they hope to gain from the program, and the experiences and strengths each mentor brings. We also consider teaching and research interests, institution type, time zones, and even scheduling availability. Finding the right matches usually takes four or five hours, but it's the most crucial part of the program.

Applications are announced each summer, and participants apply as mentors, mentees, or both. Even if someone isn't sure whether the program is the right fit, we're happy to answer questions and help them determine whether it aligns with their goals.

Once the matches are made, I get to do one of my favorite parts of the program: sending the introductory emails to each pair. After spending hours reading through the applications and thinking through potential pairings, it is exciting to finally connect the mentees to their mentors, knowing that dozens of new conversations and relationships are about to

begin. But my favorite part comes afterward: watching those relationships develop throughout the year. I look forward to seeing who reconnects at US Conference on Teaching Statistics or Joint Statistical Meetings, hearing about collaborations that began through the program, and reading the survey responses each spring. Serving as chair has given me the opportunity to get to know educators from across the country, and that has become one of the most rewarding parts of the role.

We ask mentors and mentees to meet for about 30 minutes each month throughout the academic year, but that's just a guideline. Every mentoring relationship develops a little differently. Some pairs stick to a monthly schedule, while others meet more frequently. The goal isn't to follow a strict structure; it's to create a mentoring relationship that works well for both people.

Each mentoring pair is assigned a committee liaison who checks in several times throughout the year to make sure things are going smoothly and to offer support if needed. We also host a virtual social each semester, when everyone in the program can connect with others across the statistics and data science education community. These socials give participants a chance to discuss topics that matter to them and to expand their professional network beyond their individual mentoring relationship.

Before joining the mentoring committee, I spent three years serving as a mentor. Looking back, those experiences reinforced something I now tell prospective mentors all the time: There isn't one "right" way to mentor.

Each of my mentees had different goals and needed something different from me. One was a tenure-track faculty member at a primarily undergraduate institution who wanted to talk through the challenges of balancing teaching, service, and scholarship with a specific goal of enhancing her teaching. Another was a high school teacher preparing to teach statistics for only the second time. We ended up meeting weekly because she wanted regular feedback as she planned lessons and worked through classroom challenges. My third mentee was a PhD student navigating the academic job market. It was especially fun to watch him interview for faculty positions, including one at my own institution. Although he ultimately accepted a position elsewhere, I enjoyed being able to encourage him through that exciting (and stressful) year.

Those three mentoring relationships looked completely different, and that's exactly how they should have looked. Mentoring isn't about following a formula. It's about meeting people where they are and helping them move toward whatever comes next for them.

My own experiences have shaped how I think about mentoring, but they're three stories. The end-of-year surveys consistently remind me that every mentoring relationship has its own impact.

Reading the survey responses each spring reminds me of just how different every mentoring relationship becomes. Some mentees talked about receiving feedback on teaching philosophies, and job application materials. Others appreciated having someone outside their own department to discuss challenges they weren't comfortable bringing to colleagues. One mentee described the program as providing "a low-stakes and friendly environment," where they could connect with a faculty member over multiple conversations. Another shared that their mentor attended their dissertation defense, something neither of them could have predicted when they were first matched.

Mentors found the experience just as rewarding. Several commented on how much they enjoyed watching their mentees grow in confidence over the year. One mentor wrote that they valued "building a relationship that will continue beyond this program," while another appreciated having the opportunity to give back to the statistics and data science education community that had supported them throughout their own career.

One story that especially stands out to me came from former mentee Mine Doğucu. After benefiting from the mentoring program as a graduate student and first-year faculty member, she later returned as a mentor. To me, that's one of the greatest compliments our program can receive. This past year, she and her mentee, Evan Fryer, collaborated on a lesson about accessibility and visual literacy that Evan presented at eCOTS. Together, they also developed open-access teaching materials for others to use. To me, that story captures exactly what this program is about: creating connections that grow into collaborations and, eventually, inspire participants to pay it forward.

As we approach the program's 11th year, I find myself excited about what comes next. I hope the program continues to grow, but not at the expense of what has made it successful. Going from 12 mentoring pairs in our first year to 45 today has been exciting, but I hope we never lose the care that goes into making each match. I also want the program to continue to evolve.

You don't have to have all the answers to make a difference in someone else's career. Sometimes all it takes is being willing to listen, ask thoughtful questions, and share your experiences. As I've learned over the past several years, those first conversations often become friendships, collaborations, and connections that last beyond the official mentoring program. ■

MORE ONLINE

For more information about the mentoring program, visit the ASA Section on Statistics and Data Science website at *https://sds-ed-mentoring.weebly.com/about.html.*

A Day in the Life of a Statistics Educator

Jennifer L. Green:
The Collaborative Life of a Statistics Professor and Teacher Mentor


Jennifer Green

Jennifer L. Green is an associate professor in the department of statistics and probability and in the program in mathematics education at Michigan State University. A fellow of the American Statistical Association and elected member of the International Statistical Institute, she is currently co-editor of *Statistics Teacher,* section editor for research in K–12 education for the *Journal of Statistics and Data Science Education,* and associate co-director for research with the Consortium for the Advancement of Undergraduate Statistics Education.


Michigan State University's campus on a spring day offers pink flowering trees, landscaped lawns, and bright blue skies.

6:45 a.m. We're up and going! My youngest daughter is off to school for the day. I am catching up on dishes, checking emails, and chatting with my oldest daughter about our plans to help her move out of her college dorm next week.

9 a.m. I squeeze in a quick workout, then I head off to campus.

10 a.m. The campus is springing to life—as shown in the photos, there are so many plants and trees budding and blooming right now! The spring semester is ending, and graduates are taking pictures around campus in their gowns. It's exciting to see their joy in celebrating all their accomplishments! I quickly find a parking spot—there are many available, yay! And then I head to the library to search for the collaborative work room my PhD student advises, which I have reserved. I've never been to this part of the library before and am surprised to discover we have reserved a gaming room with a large monitor!

10:15 a.m. I'm the first one to arrive at the room, so I quickly check and respond to emails while I wait. There are so many emails to catch up on!

10:30 a.m. Maria and Miguel (two of my PhD student advisees) arrive. We start by catching up on the week's events. It's toward the end of finals week, and Maria and Miguel have finished their final exams and projects. The building with our offices was closed this whole week due to an unknown substance that was found. All final exams that were supposed to be in that building had to be rescheduled, and Maria couldn't access her students' posters from her office—she had to reprint them all! What a week! We are all looking forward to participating this summer in two upcoming statistics and data science education conferences—the International Conference on Teaching Statistics and the Electronic Conference on Teaching Statistics. Today, we're planning to finish the analysis of data for our collaborative research project. We're presenting a poster about this project in one-and-a-half months at eCOTS, so we want to make good progress today. We love having a chunk of time to collaborate since the semester is wrapping up and our schedules are more open now!

11 a.m. We create a game plan for our time together, but first, pause to take a group photo! We've conducted initial explorations of students' perceptions of using generative artificial intelligence in an undergraduate mathematical statistics course, so today we plan to organize and define the codes that arose from that initial analysis. Projecting the collaborative documents on the big monitor is helpful for working through the material together and visualizing what each person is doing!

11:30 a.m. We are immersed in our work! I am going through the data and cleaning up transcriptions while Maria and Miguel draft the tables of descriptive codes, definitions, and example quotes.

12:25 p.m. Maria shares that we received a "revise and resubmit" decision on the paper she and I submitted with another collaborator to *Statistics Education Research Journal (SERJ)*. Yay! The editor and reviewers requested we make major revisions, but I assure Maria this is great news—the paper wasn't rejected! In my experience, it's rare for a paper to be accepted with minor revisions the first time it is submitted to a journal for peer review. We have a little over one month to work on and submit a revised paper, so we will need to schedule time to complete that work, in addition to the other manuscripts and ICOTS and eCOTS presentations we are preparing. There is plenty of research to do this summer!

12:48 p.m. Lunch time! Maria, Miguel, and I walk to a nearby restaurant and enjoy a meal together. We talk about upcoming program milestones, the academic job market, and the importance of community.

2 p.m. We are back at the library and dive right into collaboratively reviewing the compiled codes, definitions, and sample quotes. We begin writing a summary of our analysis methods while it is still fresh in our minds and tie up a few loose ends, so we're ready to dive into our work when we meet again in a couple weeks.

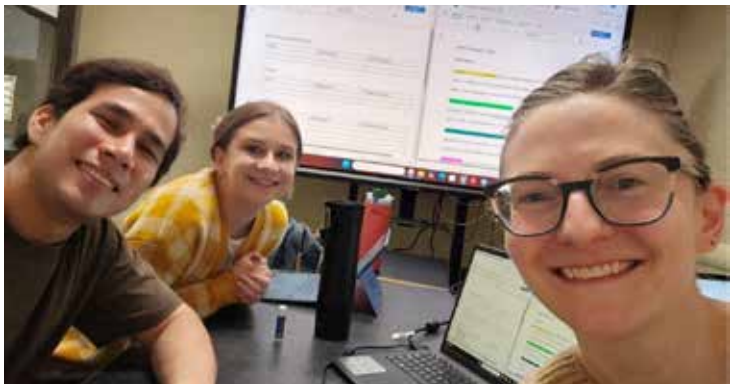
3:30 p.m. After Maria and Miguel leave, I stay in the library to check my email, schedule meetings, and review upcoming deadlines, so I can prioritize those tasks. Importantly, I need to complete some editorial work and send review decisions to authors.

4:10 p.m. I pack up my computer and decide to drive home for my next meeting since it's on Zoom, and I cannot access my campus office right now.

5 p.m. Meeting time! I join a graduate student's guidance committee meeting to talk about their progress in the program, their scholarly interests, their goals after completing their PhD, and their proposed ideas for their comprehensive exams. I *love* hearing about students' scholarly interests and ideas and learning about their work!

6:04 p.m. I'm taking a break away from my computer to take a walk and eat dinner. I'll be back later though—there's a revised paper I need to review for *Statistics Teacher!*

8:30–9:45 p.m. For my day's final work hurrah, I read the revised paper for *Statistics Teacher,* tracking changes to send to authors for final approval before passing it on for copyediting. The authors have done a great job addressing the reviewers' feedback, and I think this paper will be a wonderful addition to *Statistics Teacher!*



(From left) Miguel Rodriguez Mejia, Maria Cruciani, and Jennifer L. Green work together.

This was just one day of many, and they can all look very different! As a statistics educator, I engage in a lot of different activities:

I attend several meetings (faculty meetings, service committee meetings, graduate student advising meetings, research collaboration meetings). I teach statistics, mathematics education, and statistics education courses. In the spring of 2026, I got to co-lead a statistics and data science education seminar, where graduate students from Michigan State University, North Carolina State University, Penn State University, and the University of Minnesota met weekly via Zoom to discuss readings and ask questions of a guest speaker. I review and find reviewers for articles submitted to *Statistics Teacher* and *Journal of Statistics and Data Science Education*. And I respond to lots of emails.

As an associate co-director for research in the Consortium for the Advancement of Undergraduate Statistics Education, I support other statistics and data science educators (with Laura Le). I also collaborate with researchers at Michigan State University and other institutions on a variety of research projects (e.g., research on being a graduate teaching assistant, development of K–12 statistics teachers, undergraduate mathematical statistics courses). I mentor graduate students and read and review their papers (e.g., proposals and papers for their research practicums, comprehensive exams, and dissertations). I attend workshops and conferences to connect with other scholars and share about my work. I write research papers and grant proposals—and so much more!

There truly is never a dull moment, and I love the variety and opportunities for continual learning, exploration, collaboration, and engagement with others! ■

A Day in the Life of a Statistics Educator

Charlotte Walsh: *Meetings, Manuscripts, and Meows*

Charlotte Walsh

Charlotte Walsh is the associate director of the office of research and sponsored programs at Midwestern University in Glendale, Arizona. She completed her PhD in statistics education at the University of Florida, an MS in biostatistics at the University of Minnesota, and a BA in mathematics and sociology anthropology with concentrations in statistics and management studies from St. Olaf College in Northfield, Minnesota. Since 2020, she has worked at Midwestern in research administration and biostatistical consulting in multiple areas of clinical research. She enjoys working with statistics researchers at all levels to analyze and interpret their data to answer research questions and achieve important objectives.

Walsh has taught biostatistics and quantitative research in the master of public health program at Midwestern and introductory statistics and online business analytics courses at Santa Fe College in Gainesville, Florida. She has been an AP Statistics reader for several years and enjoys attending statistics education–focused conferences. She lives in Arizona with her husband, and they welcomed their first baby in June of 2026.

7 a.m. The alarm goes off, and I usually roll out of bed soon after, especially with the early sunrise here in Arizona!

7:30 a.m. I enjoy a nice breakfast of eggs and a bagel with my husband before we both head to our shared office to start our days.

8:30 a.m. I'm able to work from home two days a week—it's definitely a perk to not be in traffic driving across the Phoenix metro area for 1.5 hours every morning! I log into my computer and check my email.

8:35 a.m. I respond to emails related to my responsibilities in research administration about intramural grant approvals, student travel conference reimbursements, and research compliance training.

9:30 a.m. I have a bi-weekly check-in with my research administrator—who supports the institutional review board and the Institutional Animal Care and Use Committee—about application status and workflow. We discuss the status of each committee, turnaround time on application processing, and issues or complaints from faculty members. As a small research university, my staff and I are always working to communicate with faculty and students about the need to start early with research study applications.

10:07 a.m. Coffee break! I enjoy making a latte with my Nespresso maker in the midmorning when working from home.

10:15 a.m. Back to answering more emails and responding to Teams messages from my staff.

11 a.m. Try to do a stretch break and get up from my desk for a little bit. My cat, Paisley, thinks it's time for lunch and starts meowing incessantly!

11:03 a.m. Meeting with colleagues in the ASA Section on Statistical Consulting Pathways to Promotion Committee to discuss our upcoming webinar on networking.

12:06 p.m. Enjoy a lunch break of Mexican leftovers from our favorite restaurant. Paisley is very happy to finally get her wet food for lunch and lounges in the Arizona sun near our sliding glass doors.

Charlotte's cat, Paisley, sits in her daily sunny spot

Paisley peers over Charlotte's computer to remind her it is time to take a coffee break.

12:50 p.m. Work on article revisions for a manuscript that was submitted to *Pharmacotherapy: The Journal of Human Pharmacology and Drug Therapy.* This was an interesting project that I worked on with a college of pharmacy faculty member from our Illinois campus, her resident, and other collaborators from the Chicago area. It's always nice to receive revisions for an article when the first reviewer starts their comments with, "Well-written manuscript with only a few minor suggestions!"

1:23 p.m. Still working on article revisions for the project in R by re-running analyses and adding in a few extra tables by an additional subgroup analysis. I'm thankful I always document my R code well since the previous analysis I conducted for this project was over two years ago!

2:40 p.m. Finally finish the revisions needed for the statistical analysis and methods section of the article and send off my edits to the faculty member. I send the faculty member and resident best wishes for positive feedback from reviewers and hopefully an accepted article in a few more months.

3:00 p.m. Finish with some final emails before transitioning to checking in on my online business analytics course.

3:23 p.m. Answer student emails about an assignment on marketing analytics that requires creating a pivot table chart in Excel to look at total sales revenue over time for a small business.

4:02 p.m. Prepare to record a lecture for the course focusing on predictive analytics for finance.

5:14 p.m. Finish the recording and upload the lecture to Canvas for the module next week.

5:35 p.m. Finish work and relax on the couch for a bit of reading from my new fantasy book before starting to make dinner.

7:02 p.m. Enjoy a lovely evening walk with my husband in the nice dry 90-degree heat of the desert!

8:00 p.m. Watch the latest episode of a beach home renovation show and pay attention to Paisley, who feels I have ignored her all day.

10:25 p.m. Head to bed feeling accomplished about my day!*

**This typical day was written a few days before giving birth to my first child, so my schedule changed entirely with taking care of a new infant!* ■*

STAT*tr@k*

Quantifying the Invisible Factors of Athlete Performance and Game-Winning Strategy

Adam Barone, Senior Editor (Contract)

Adam Barone has been recognized seven times for excellence in journalism by the New England Press Association, New Hampshire Press Association, and Hoosier State Press Association. He's covered a diverse range of topics, including technology, business, social issues, and sports. He also adds 20 years of award-winning experience as a copywriter in the marketing/advertising world.

Coaches have always described great athletes with words that resisted measurement: instincts; field vision; explosiveness; anticipation. Today, advances in measurement technology and statistical modeling are transforming those once-subjective observations into measurable quantities, allowing researchers, teams, and leagues to invent new datasets and quantify once-invisible factors of the game.

"These are quantities they didn't think about in the *Moneyball* era," says Ron Yurko, assistant teaching professor in the department of statistics and data science at Carnegie Mellon University and director of the Carnegie Mellon Sports Analytics Center. "The *Moneyball* era was like, 'Oh, this is a stat that people are overlooking. It's a good measurement.' Now, we're able to collect and analyze data that coaches and scouts had always analyzed visually. We can now directly measure those factors based on new athlete tracking data that's being collected and put hard numbers to athletic traits demonstrated in real time while actually playing in the game."

It's the kind of data Yurko could have only dreamed about when he first entered the sports analytics world as an intern with the Pittsburgh Pirates in 2014, where a big part of his role involved documenting in-game datapoints. He watched every game from the video booth, identifying pitch types and logging precise locations of all defenders as pitches were released, balls entered play, and runners crossed the plate. This painstaking, manual process produced spatial datasets the Pirates used to refine defensive positioning during baseball's early embrace of infield shifting.

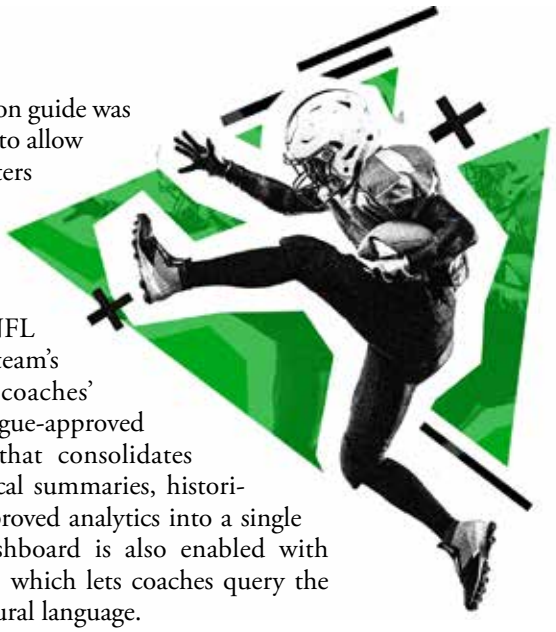
"It was a little horrifying in a way because I realized I was actually creating the data," says Yurko. "And then the following morning, I would go through the recording of the game from a bird's-eye angle."

But the latest advances are rendering obsolete the need to manually track such data.

In Major League Baseball, the intern in the video booth has been replaced by a system of networked cameras and computer vision called Hawk-Eye. It records every player's movement automatically, hundreds of times each second. Originally developed in the early 2000s to reconstruct ball trajectories in cricket, the platform quickly gained worldwide attention after professional tennis adopted it as a line-calling aid in 2006. MLB adopted it in 2020, and now, multiple high-speed, synchronized cameras mounted throughout MLB stadiums continuously track player position, ball, bat, and, more recently, full-body biomechanics through kinematic tracking, which tracks the movements of athletes' individual joints.

Kinematic tracking allows analysts to model the biomechanics underlying performance—from how efficiently a batter transfers energy through the swing to how a pitcher's body mechanics influence velocity, command, and injury risk. This data creates new opportunities for statistical modeling, player evaluation, and player development.

"Kinematic tracking data is one of the really cool new datasets that's becoming available in lots of different leagues," says Scott Powers, assistant professor of sport analytics and statistics at Rice University and director of the Hutchinson Leadership Initiative in Sport Analytics. "They're not just tracking the player's center of mass over time—not just the location of the player—but they're doing pose estimation on the player. They've got data points on all the joints, and they're able to reconstruct the pose—essentially the skeleton—of the players. Now you're able to track not just where the player is, but how they're moving their arms and legs."



Another example of this new kind of data at work is STRAIN, a metric created to evaluate pass rushing in the NFL. It was developed by Yurko and fellow ASA members Quang Nguyen (a PhD student at Carnegie Mellon), and Gregory Matthews, associate professor of statistics at Loyola University, Chicago.

Traditional pass-rush metrics—sacks, quarterback hits, and hurries—only measure outcomes at the end of a play and can be influenced by factors beyond an individual defender's performance. In contrast, STRAIN uses continuous player-tracking data to measure defensive pressure throughout the play by combining two directly observed quantities: the distance between the pass rusher and the quarterback and the rate at which that distance is shrinking. By evaluating pressure continuously rather than waiting for a binary outcome, like a sack, the metric provides a more granular and consistent measure of pass-rushing performance.

In their 2024 paper in *The American Statistician,* "Here Comes the STRAIN: Analyzing Defensive Pass Rush in American Football with Player Tracking Data," Yurko and team discuss the impact of this new level of data: "In recent years, tracking data has replaced traditional box score statistics and play-by-play data as the state of the art in sports analytics. Numerous sports are collecting and releasing data on player and ball locations on the playing surface over the course of a game. This multiresolution spatiotemporal source of data has provided exceptional opportunities for researchers to perform advanced studies at a more granular level to deepen our understanding of different sports."

STRAIN would have been impossible using conventional play-by-play and box score data because the underlying measurements didn't exist. The metric depends on the NFL's continuous player-tracking within its Next Gen Stats platform, which records the position of every player throughout every play with RFID sensors embedded in players' shoulder pads and in the football itself. The tech enables analysts to calculate player locations, movement trajectories, speed, acceleration, and relative distances over time.

Interestingly—perhaps to prevent the NFL from becoming an arms race in analytics software—league rules require teams to only use NFL-issued, specially configured computers and tablets that do not permit internet access or installation of non-approved software during games. To ensure compliance, the league collects all these devices immediately after games. And teams don't have live access to the Next Gen Stats Decision Guide, a quantitative modeling tool that estimates a team's probability of winning under different strategic options. The decision guide was created specifically to allow fans and broadcasters access to the same types of analytics used by teams to prepare for games.

However, the NFL does permit the team's analyst in the coaches' booth to use a league-approved Excel dashboard that consolidates game data, statistical summaries, historical trends, and approved analytics into a single interface. The dashboard is also enabled with Microsoft Copilot, which lets coaches query the information in natural language.

"What's really cool about these advances is they actually close the gap between the people with on-field experience and those with more technical backgrounds," says Powers. "Instead of only talking about the outcome, we're now able to talk about *how* a player achieves that outcome."

This flood of new data is also creating new statistical challenges. As modern tracking systems produce increasingly detailed observations of athletic performance, extracting meaningful insight depends not only on what can be measured, but also on understanding what those measurements mean in the context of gameplay.

Statistical vs. Situational Awareness

In their 2026 paper, "Swinging, Fast and Slow: Interpreting Variation in Baseball Swing Tracking Metrics" in *The American Statistician,* Yurko and Powers collaborated to look at MLB's newly released bat-tracking data captured by Hawk-Eye. Rather than interpreting these new metrics at face value, Yurko and Powers showed that they must be understood within the context of the batter's intent, pitch location, ball-strike count, and swing timing. By combining kinematic tracking data with Bayesian hierarchical modeling and causal inference methods, they demonstrated how statisticians are moving beyond simply collecting richer measurements to developing new frameworks for interpreting them. Statistical models can identify patterns that remain invisible to the naked eye, but those insights must ultimately be translated into real-time situational judgments during games.

ASA Fellow Hal Stern—provost, executive vice chancellor, and distinguished professor of statistics at the University of California, Irvine—has been thinking about this situational-statistical tension for decades. "The statistics that are easiest to do,

and the first to do, are at the aggregate level. It's easy to show in baseball that teams were sacrificing—bunting—too often. It's a bad play. It generally lowers the number of runs you're going to score. But that doesn't eliminate the possibility of a specific situation happening where you should do it," Stern says.

Indeed, the impacts of these latest advances in sports analytics are most noticeable to fans when coaches begin making in-game decisions that challenge conventional wisdom—as with football's fourth-down revolution. Statistical models can now estimate the value of punting, attempting a field goal, or trying to extend the drive by combining conversion probabilities with the effect of each possible outcome on a team's chances of winning. This new analytical framework has helped pushed coaches away from traditional risk aversion. In situations where Next Gen Stats favored going for it by at least two percentage points in expected win probability, teams kept their offenses on the field only 31% of the time in 2017. By 2020, that rate had risen to 53%.

Yet even these sophisticated tracking systems measure only what athletes do—not necessarily how they decide what to do. But that is changing. Sports analytics researchers are now increasingly asking whether the cognitive processes that precede movement can also be measured.

The Next Frontier in Quantifying the Invisible Game

Today's tracking systems know where every athlete is on the field and how each limb moves throughout a play, but the next frontier may be determining what athletes actually see. Elite athletes routinely anticipate events before they occur, recognizing subtle cues in an opponent's posture, movement, or positioning. Coaches have long described these abilities as instincts or "feel for the game." Although stadium-scale systems like Hawk-Eye do not yet perform true eye tracking, advances in computer vision, facial landmark detection, and gaze estimation are rapidly narrowing that gap. Increasingly, researchers are beginning to study these factors as measurable phenomena.

A 2019 review in *Psychology of Sport and Exercise,* "Anticipation in Sport: Fifty Years On, What Have We Learned and What Research Still Needs To Be Undertaken?" by A. Mark Williams and Robin Jackson, concluded that athlete anticipation in sports is supported by several interacting perceptual-cognitive skills that include recognizing postural cues, identifying recurring patterns of play, integrating contextual information, and detecting deceptive intent. Drawing on five decades of research, the review found that expert performers consistently anticipate more accurately than novices because they extract predictive information earlier and more effectively, allowing them to forecast an opponent's actions before they fully develop.

"I've seen research on gaze tracking that seeks to connect it with athlete decision-making," says Yurko. "Researchers are evaluating the extent to which gaze tracking can predict decision-making: Do athletes who acquire more information with their eyes make better decisions? If so, can we train athletes to collect more information with their eyes, and does that improve their decision-making? Collecting this data using markerless motion capture in the context of real competition would significantly increase the scale of the data at our disposal to address these research questions."

One 2023 eye-tracking study, "Visual Search Strategies of Performance Monitoring Used in Action Anticipation of Basketball Players" published in *Brain and Behavior,* showed elite basketball players employ markedly different visual search strategies than less experienced players. Rather than following the ball, elite players quickly identify and repeatedly return their gaze to an opponent's body—the source of the most informative movement cues. The study noted that expert players anticipated shot outcomes significantly more accurately than novice players because they "instantly searched and identified important cues," concentrating their visual attention on the shooter's body instead of the ball. The authors concluded that improving anticipation may depend less on tracking the ball's flight than on learning where and when to look.

"I do think it's probably a while before we see this type of technology carried out at scale though," adds Yurko. "We are only just in the start of the skeletal tracking era, with leagues and teams still figuring out how to handle this data. This notion of trying to infer where athletes are looking is something that teams have tried to figure out—e.g., using the orientation of the shoulder pads to infer where the QB is intending to throw—but no-look passes completely disrupt this."

Throughout the history of sports analytics, the biggest breakthroughs have come not from asking better questions of existing data, but from inventing entirely new kinds of data. Box scores gave way to player tracking. Player tracking expanded into biomechanics. Tomorrow's advances may come from quantifying perception, anticipation, and decision-making themselves. As technology continues to reveal previously invisible aspects of athletic performance, statisticians will once again be tasked with answering a familiar question: Now that we can measure it, what can we learn from it? ■

STATS4GOOD

Educational Opportunities with Data for Good

Happy 2026–2027 academic year! The start of a new academic year is the perfect time to explore the many ways Data for Good can connect with the classroom.

One opportunity is to incorporate Data for Good examples into classroom instruction. We can teach students about skewed distributions and outliers using data on housing prices and affordability, for example. Statistical inference can be taught using data drawn from research on the social sciences, climate change, community action, and any number of areas with a Data for Good focus. These examples can also highlight the work of leading organizations such as Statistics Without Borders (*www.statisticswithoutborders.org*) and the Human Rights Data Analysis Group (*https://hrdag.org*). By incorporating them, we can introduce beginning students to the world of data for social good, connect advanced students with leadership opportunities, and underscore the impact statistical science has on people's lives.

Including Data for Good examples in lectures, homework problems, and test questions can also inspire research related to coursework, leading to papers, Research Experiences for Undergraduates activities, and capstone projects. A great example is DataFest, the American Statistical Association's annual student data challenge. Colleges and universities host DataFest events in which teams of students spend a weekend exploring a dataset used at events across the country. To see what is possible when Data for Good intersects with education, consider topics from recent DataFest events: mapping patient journeys using medical data, analyzing high-risk student behaviors, and supporting legal experts providing pro bono services.

Student groups and ASA chapters can also sponsor hackathons. These can be especially effective when local groups focus on community concerns, such as housing affordability or a proposed data center. ASA chapters can support students, foster relationships between students and faculty, and feature Data for Good presentations at chapter meetings.

Bringing Data for Good into the classroom intentionally can be especially powerful when paired with an interdisciplinary approach. Researchers from different departments can collaborate, combining their expertise and strengths to produce results with the greatest potential to serve the public good. Subject matter experts familiar with a particular data source, methodology, or statistical challenge can strengthen the entire team.

Because statistics and data science are inherently interdisciplinary, the methodologies introduced by one expert can be applied to a wide variety of problems and settings. I see this every day. With a PhD in statistical astrophysics, nearly all my Data for Good work can trace its analytic DNA to solving an astrophysics problem. An interdisciplinary approach allows Data for Good projects to introduce students to a broader range of methodologies than would otherwise be possible.

Getting Involved

Don't forget to follow up on JSM. Whether you attended or not, you can access the program online at *ww2.amstat.org/meetings/jsm/2026/onlineprogram*. Reach out to authors, read abstracts, watch plenary presentations, and consider how 2026 ASA President Jeri Mulrow's Communities in Action initiative could support your Data for Good projects.

Now is also a good time to consider participating in DataFest. The deadline is still a few months away, so take some time to learn about the program and consider hosting an event. Find details at *ww2.amstat.org/education/datafest*.

One of the best ways to practice Data for Good in an educational setting is to become a tutor. I began volunteering as a math tutor for a local social service agency in high school. In my experience, it is one of the most important things I have ever done in Data for Good. Tutoring also reinforces our own understanding of statistical practice and our ability to communicate methods and results. Opportunities are available through university student service centers, departmental programs, and independent agencies.

Bringing Data for Good examples, ideas, and experiences into the classroom enriches students' education while providing educators with new research opportunities. Participating in student groups and events such as DataFest enables students to put their education into action and produce tangible results. Connecting the classroom with Data for Good introduces students and educators alike to hands-on work that affects people's lives every day—and opens the door to new possibilities. ■

David Corliss
With a PhD in statistical astrophysics, David Corliss works as a data scientist in industry. He serves on the ASA Board as a Council of Chapters representative and is the founder of Peace-Work, a data for good nongovernmental organization.

DECIDING FACTORS

Add a Little Structure to Your Decision-Making

Mark C. Otto and MinJae Lee

Mark C. Otto is a retired, but not retiring, US Census Bureau and US Fish and Wildlife Service statistical scientist. He is chair of the ASA's Committee on Applied Statisticians and has served as the president of the Washington Statistical Society and as the Membership Council vice chair.

MinJae Lee is a biostatistician and professor at McGovern Medical School, UT Health Houston, where she leads the division of clinical and translational sciences. Her research focuses on developing and applying innovative statistical methods to address real-world research challenges.

Decision-making is both a process and a matter of luck. In our previous articles, we argued that good decisions are judged by the quality of the process. Structured Decision Making (SDM) provides a practical framework for putting that philosophy into action.

Think of Atul Gawande's *Checklist Manifesto.* Running down a list keeps us on track. The list tells us what to look for in the little corners and frees us to be more creative because the routine stuff is laid out for us. The list is the acronym PrOACT: **Pr**oblem framing, listing **O**bjectives, creating **A**lternatives, estimating **C**onsequences, and working through the **T**radeoffs.

The Alliance for Decision Education provides an accessible introduction to these steps and practical examples of how they can be applied at *alliancefordecisioneducation.org/what-is-decision-education/structuring-decisions*. If you can explain and reflect on your process, it will be clearer to you, and you will be able to improve your decision-making next time. Finally, you need to act on the decision. Duh, but how many times have we sweated over what to do until we feel we have already done it?

Consider a man buying a car. When it is just him and the dealer, framing is easy: He wants something stylish, cool, fast, red, and affordable-ish. On impulse, an expensive, flashy red Miata wins.

Now the man is reminded he is a husband, and his wife adds safety, reliability, and room for a car seat, while objecting to the flashy objective. New alternatives emerge. The more expensive Miata loses out to the Subaru's efficiency, reliability, and safety. The objectives expand, and the consequences of each remaining alternative are weighed against that longer list. Groups fight to the death over alternatives but can talk civilly about values or objectives. They can do this in marriage, too.

Ralph Keeney suggests you can almost always find more objectives than you started with, and the ones you identify later often decide the choice. More objectives and alternatives emerge when we throw the status quo out the window. It is an acquired skill that requires creativity. Keeney's favorite example is choosing a restaurant to meet a client. You think about cost, cuisine, and location. Halfway through the meal, you realize the

thing that mattered was whether you could hear each other over the noise. That objective was not on your list when you started; now it is the one that decides where you meet next time.

With more objectives and alternatives, we need the SDM structure. Consequences are the predictions of how well each alternative fulfills each objective, and prediction is entirely within the statistician's domain, as is weighting. We weight the objectives, multiply them by the consequence predictions, and sum the products for each alternative to calculate utilities. Adjusting the consequences and weights until they make sense is how we work through the tradeoffs.

With kids, objectives multiply again. Safety was on the list; now it is at the top. Room for a car seat becomes room for two car seats, then for a stroller, then for the whole under-eight soccer team when it is your carpool week. Sliding doors, once a joke, are now their own objective. The alternative set has gone through three revisions and is closing in on a minivan.

Next, the wife realizes, "We live in DC. Do we need a car at all?" This is not a small question. The Metro runs. Zipcar is a block away. Uber is everywhere. Rental cars are available for beach week. A stroller-friendly neighborhood beats a stroller-friendly SUV for at least half of their trips.

Now the family frames the decision as transportation rather than just buying a car. This refines their objectives and yields a much richer set of alternatives. The structure is earning its keep. Without it, this conversation goes nowhere or, worse, devolves into an argument. With it, they can list their objectives together (get to work, get the kid to daycare, get to soccer, get to grandma's four hours away, keep the monthly costs sane, avoid the parking headaches) and score the alternatives (own a minivan, own something smaller and rent for soccer weekends, own nothing and rely on transit plus Zipcar plus the occasional rental) against those objectives honestly. They may still buy a car. They may not. The point is that the decision they make will be a decision, not a default.

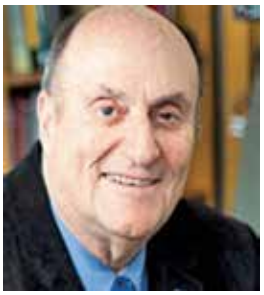
While car buying is an informative example, the same structured thinking applies to scientific research, clinical care, and the many collaborative decisions statisticians guide clients and colleagues through every day. Statisticians already practice much of SDM, often without realizing it. Framing shapes study design. Objectives are reflected in the research questions and outcome variables. Alternatives are the hypothesis space. Consequences are predictions and their uncertainties. Tradeoffs are familiar to anyone who has balanced multiple outcomes, optimized competing objectives, or developed a composite measure. The value is not that statisticians learn a completely new process, but that SDM makes an intuitive process explicit, transparent, and repeatable. What SDM adds is the discipline of doing each of these steps deliberately, on paper, with everyone in the room—instead of privately, in your head, or in front of the salesman at the dealership.

This process begins with clarifying the scientific question, identifying the outcomes that matter most, considering alternative study designs, anticipating the consequences of each design, and weighing tradeoffs ...

In collaborative research, we often follow these same steps without explicitly calling them SDM. This process begins with clarifying the scientific question, identifying the outcomes that matter most, considering alternative study designs, anticipating the consequences of each design, and weighing tradeoffs such as feasibility, cost, precision, and participant burden. SDM provides a common language and framework that make this process explicit, transparent, and collaborative, helping multidisciplinary teams make better-informed and more transparent decisions together. This is Gawande's list for decision-making. Use it well. ■

Next time, we move beyond framing the problem to the difficult step of identifying the values and objectives that guide our decisions.

Emory's Michael H. Kutner Honored with Archived Interview



Michael Kutner

Michael H. Kutner, an ASA member for more than 55 years, was recently honored by the Emory University Department of Biostatistics and Bioinformatics by recording an interview that will be archived at the Rollins School of Public Health at Emory University.

Kutner is an emeritus professor at Emory and earned his doctoral degree from the Texas A&M University Department of Statistics in 1971. A distinguished biostatistician, teacher, mentor, and consultant, he is an ASA Fellow and the recipient of the ASA Founders Award for service and leadership. In 2004, he became an Emory Rollins Endowed Professor of Biostatistics. He has also received the ASA's W. J. Dixon Award for excellence in statistical consulting and the ASA's Mentoring Award for his superb mentoring skills.

One important area of leadership has been his work on improving the statistical process by helping other statisticians consult and become mentors. Kutner was the recipient of the ASA's Karl E. Peace Award for Outstanding Statistical Ccontributions for the Betterment of Society. This award was established in 2012 to recognize substantial contributions to the statistical profession and society.

Kutner is the lead author of two highly cited and popular textbooks: *Applied Linear Regression Models* (fourth edition, 2004) and *Applied Linear Statistical Models* (fifth edition, 2005). *Applied Linear Statistical Models* is considered by many biostatisticians, statisticians, and data analysts to be a leading authoritative text and reference in the fields of regression, analysis of variance, and design of experiments. Many major research universities in the US and across the world have adopted these textbooks into their training programs. The texts provide a central resource for introducing individuals to the application of statistical methods in business schools, agricultural programs, pre-medicine curricula, and other graduate programs.

A few years ago, Kutner received an email from a faculty member in Canada who wrote that they seriously considered three other regression books for their class, but once they started reading them in depth, they saw that *Applied Linear Regression Models* had the right balance of a solid mathematical foundation, thorough coverage of the application of statistics without going overboard, and great homework questions. The email went on to mention that his book was awe-inspiring and well-written, and they planned to use it for years to come. View the video on YouTube: *www.youtube.com/watch?v=N6WhVDZhrlA* ■

Pearl Named AI Pioneer

Judea Pearl, a longtime ASA member and author of *The Book of Why*, has been named one of 50 "AI Pioneers" by the Boston Global Forum and its AI World Society initiative. The recognition honors scientists, technologists, scholars, and business leaders whose work is shaping the future of artificial intelligence.

A Chancellor's Professor Emeritus of computer science at the UCLA Samueli School of Engineering, Pearl is recognized in the AI Research & Science—The Architects of the AI Age category for his contributions to AI research from the 1980s to present, including the development of the Bayesian networks and a mathematical framework for causal inference.

Judea Pearl

Among Pearl's many other honors are the Turing Award, the BBVA Foundation Frontiers of Knowledge Award, and the World Leader in AI World Society Award. Pearl and his fellow AI pioneers were honored at the forum's America at 250 conference held at Harvard University in May.

To learn more about the award, visit *https://bostonglobalforum.org/publication/16058*. Read the full story online at *https://tinyurl.com/vr22kacs*. ■

Jensen Receives Gerald J. Hahn Q&P Achievement Award

Peter Parker, Gerald J. Hahn, Q&P Achievement Award Committee Chair

Throughout Willis Jensen's career, he has made exceptional, contributions to quality and productivity through innovative collaborations with industry and academic partners. At CHG Healthcare, he led a people analytics and business intelligence team that provided data

Willis Jensen

and analytics support to leaders and executives. At W. L. Gore & Associates, he served as an industrial statistician, global statistics team leader, and human resources analytics leader, improving data-driven decision-making practices across manufacturing, research and development, marketing, business, and human resources. After 20 years in industry, he recently moved to academia, where he's an associate professor at Brigham Young University, teaching courses in statistics and advising graduate students in the McKay School of Education.

As a statistician at Gore, Jensen made an impact on medical device quality, with work in sound statistical analysis, design of experiments, measurement quality, and process validation. He also taught and supported more than 500 technical associates as a consulting statistician and designed internal courses that blended teaching statistical concepts and practical considerations into a holistic approach. As leader of the global statistics team at Gore, Jensen guided new and experienced statisticians and sharpened the team's vision, leading to harmonized tools and practices.

In professional societies, Jensen has been active and served in numerous leadership roles in the American Statistical Association, American Society for Quality, International Statistical Engineering Association, and Society of People Analytics. He has served as an associate editor of *Technometrics* and as an editorial review board member for the *Journal of Quality Technology, Quality Engineering,* and *Quality and Reliability Engineering International.* His distinguished service on these quality and productivity journals is evidence of his recognized expertise and leadership in the statistical community.

Jensen is a sought-after speaker and an enthusiastic communicator. His presentations resonate with audiences, as he seamlessly integrates research and practice. He is a three-time winner of the Shewell Award for the best presentation at the Fall Technical Conference. Jensen's research—the result of collaborations between industry and academia—has focused on applications of statistical methods for solving problems. His publications have earned numerous accolades, including the Soren Bisgaard Award for best paper in *Quality Engineering* and the Lloyd Nelson Award for best paper in the *Journal of Quality Technology.* In 2019, Jensen was elected Fellow of the American Society for Quality for the "training of numerous students in employer-sponsored, quality-related courses; statistical leadership in industry; significant research contributions and presentations in statistical process control and design of experiments; outstanding service to multiple American Society of Quality journals; and for helping bridge the gap between the theory and practice of industrial statistics."

Throughout Jensen's career, he's made lasting effects and demonstrated leadership in promoting quality and productivity through statistical methods in industry, service, and mentorship. For these reasons, Jensen is a deserving recipient of the ASA Gerald J. Hahn Q&P Achievement Award.

Jensen will give the Q&P plenary address at the Fall Technical Conference, information for which can be found at *https://falltechnicalconference.org.* ■

Raftery Awarded the IFCS Research Medal

Adrian Raftery

Adrian Raftery, Boeing International Professor of Statistics and Sociology and adjunct professor of atmospheric sciences at the University of Washington, has been awarded the IFCS 2026 Research Medal, one of the highest honors presented by the International Federation of Classification Societies. The award recognizes individuals whose research has made fundamental contributions to the advancement of classification, clustering, data science, and related fields.

Raftery is widely recognized for his pioneering work on model-based clustering and helping to establish a statistical framework based on finite mixture models that provide a coherent approach to clustering, classification, and density estimation. He has also made foundational contributions to Bayesian model selection and Bayesian model averaging, providing systematic approaches for addressing model uncertainty in complex statistical analyses. His

research has had broad impact across disciplines, including genomics, environmental science, sociology, astronomy, and network analysis.

In addition to his research contributions, Raftery has had a major effect on the field through mentorship, leadership, and service. He founded the Working Group on Model-Based Clustering, an ongoing international forum that has fostered collaboration, supported early-career researchers, and facilitated numerous scientific collaborations. Many of the papers presented at IFCS conferences stem from those collaborations.

As an ASA Fellow, Raftery is also a member of the National Academy of Sciences, an elected member of the International Statistical Institute, a fellow of the Institute of Mathematical Statistics, and an honorary member of the Royal Irish Academy

Visit the IFCS Research Medal website at *https://ifcs2026.unimib.it/ifcs-research-medal* for more information about the award. For more information about Raftery, visit his website at *https://sites.stat.washington.edu/raftery.* ■

Wu Receives the 2026 SSC Gold Medal

Changbao Wu, an ASA Fellow and professor of statistics at the University of Waterloo, has received the 2026 Gold Medal of the Statistical Society of Canada. The award recognizes his outstanding contributions to the theory and practice of survey methodology, including

Chanbao Wu

innovations in model-calibration techniques, empirical likelihood methods for complex survey data, and the analysis of non-probability survey samples.

Read more about the award on the SSC website at *https://tinyurl.com/5n8mksx7*. ■

Obituary

Agnes Herzberg

Jerry Lawless and Mary Thompson

Agnes Herzberg

Agnes Margaret Herzberg died in Kingston, Ontario, on June 2, 2026, at the age of 87. She made important and wide-ranging contributions as a researcher and promoter of statistics in science and public policy. From 1991–1992, she served as the Statistical Society of Canada's first female president.

Agnes was born on December 12, 1938, in Saskatoon, Saskatchewan. Her parents, Gerhard Herzberg and Luise Oettinger, were physicists who emigrated to Canada from Germany in 1935 to escape Nazi persecution. In 1971, while working at Canada's National Research Council in Ottawa, Gerhard was awarded the Nobel Prize in Chemistry for his work in spectroscopy.

Following high school in Ottawa, Agnes completed her undergraduate studies in mathematics at Queen's University in Kingston and then moved to the University of Saskatchewan for graduate school, earning her PhD in 1966. Her thesis on response surfaces and rotatable designs resulted in three papers in *The Annals of Mathematical Statistics.* Experimental design remained a major area of research for her whole career.

In February 1966, Agnes began a postdoctoral fellowship with David Cox at Birkbeck College at the University of London. In September 1966, Cox moved to the department of mathematics at Imperial College London as a professor of statistics, and Agnes accompanied him. Then, in March 1968, she joined the department as a lecturer. Statisticians from all over the world visited Imperial College London, and Agnes forged collaborations with many of them, including David Andrews, Peter Bickel, Norman Draper, and Valerii Fedorov. Beyond her experimental design work, a particularly notable achievement was her widely cited 1985 book with David Andrews, *Data: A Collection of Problems from Many Fields for the Student and Research Worker.* The book provided datasets and backgrounds on their sources in an era when such data was not widely available. In 1988, Agnes returned to Canada as a professor in the department of mathematics and statistics at Queen's University, retiring in 2004. While at Queen's, she continued working in experimental design but also found inspiration from mathematics colleagues. One notable publication was a 2007 paper with Ram Murty on the mathematics of Sudoku, "Sudoku Squares and Chromatic Polynomials."

One of Agnes's major achievements at Queen's was her creation of a series of meetings on statistics, science, and public policy. In 1992, Queen's acquired Herstmonceux Castle in southern England through a donation. This motivated Agnes to organize the initial meeting, which was held at the castle in April 1996. For all but five years, these meetings continued annually to 2024 and included statisticians, scientists of all types, historians, journalists, high-ranking public servants, diplomats, high court judges, and legislators. Agnes remained the driving force behind each meeting, organizing the program and dealing with fundraising, logistics, and editing and publishing the proceedings.

Professional service was important to Agnes. In addition to numerous roles in the SSC, she served on the Royal Statistical Society's council. She was an associate editor for *Biometrika*, *Annals of Statistics, Journal of Statistical Planning and Inference,* and *Canadian Journal of Statistics.* From 1980–2006, Agnes was editor of the International Statistical Institute's *Short Book Reviews*; she was a tireless promoter of books about statistics, and during this period, around 2,500 books were reviewed.

Agnes received numerous honors, including elected fellowships in the American Statistical Association, Institute of Mathematical Statistics, and American Association for the Advancement of Science. In 2008, she was named a Specially Elected Fellow of the Royal Society of Canada. She was awarded the International Statistical Institute's Henri Willem Methorst Medal for service, and in 1999, she received the Statistical Society of Canada's Distinguished Service Award. In 2007, the SSC named her an honorary member. In 2014, she won the SSC's Lise Manchester Award for annually "bringing together statisticians, scientists, politicians, and public servants from Canada and around the world" since 1996 to tackle problems at the intersection of statistics, science, and public policy.

Agnes struck up friendships in myriad ways, and her circle went far beyond statisticians and academic colleagues—from children of statisticians and taxi and bus drivers to hairdressers and shopkeepers. She was close friends with musicians and generous in supporting their artistic endeavours. She always stayed in touch with friends, who would often receive books she thought would interest them. She loved donuts and was known to give them to her favorite bus drivers.

Agnes was a major international contributor to the statistical sciences and other facets of science and society. For this and her friendship and loyalty to so many, she will be greatly missed.

Entering Our Second Century: Annual Report from the Washington Statistical Society

Benmei Liu, WSS President

Outgoing WSS President Benmei Liu, incoming WSS President Lisa Mirel, and several award recipients at the June 17 WSS Annual Award Ceremony. From left: Lloyd Hicks, Lisa Mirel, Ujjayini Das, Wesley C. DeMontigny, Ethan Chen, Patrick Roney, Benmei Liu, Glenn White, Rishik Shenolikar, and Callie Deng.

Benmei Liu, WSS President

The 2025–2026 service year (July 1, 2025–June 30, 2026) marked a defining chapter in the history of the Washington Statistical Society. As the society celebrated its 100th anniversary, it reflected on a century of contributions to the statistical profession while launching new initiatives to strengthen member engagement, expand partnerships, and prepare for the future. Despite significant challenges in the first half of the year, members and volunteers demonstrated resilience and dedication in the second half, making it one of the society's most active and successful years in recent memory.

During the fall of 2025, external factors affecting member availability and event planning significantly disrupted WSS activities. As a result, the Morris Hansen Lecture and Roger Herriot Award Lecture were postponed until spring 2026 and the traditional WSS holiday party was canceled. Despite these challenges, WSS resumed a full slate of activities beginning in January.

The society's centennial celebration began on January 20 at NORC in Washington, DC, where more than 75 attendees—including past WSS presidents, current members, the ASA president, and the ASA executive director—gathered to celebrate the society's history and impact. As part of the centennial initiative, WSS also updated its history book to document the society's first 100 years through June 30 of this year.

WSS continued to expand its programming throughout the spring. In February, the society hosted its first student representative–led event, the Petals and Probabilities Cherry Blossom Forecast Hackathon at Georgetown University Capitol Campus, bringing together students to apply statistical modeling to predict Washington's peak bloom date. The postponed 33rd Annual Morris Hansen Lecture was successfully held in March at Summit Consulting in Washington, DC, attracting more than 100 attendees for a presentation by Partha Lahiri and discussions by Rebecca Steorts and Lisa Mirel. In June, the President's

Students, the invited speaker, and several WSS board members wear WSS 100th anniversary commemorative T-shirts at the Petals and Probabilities Cherry Blossom Forecast Hackathon.

Invited Talk and Annual Awards Ceremony was held at Westat in Bethesda, Maryland, drawing more than 65 attendees. The event featured a keynote by Travis Hoppe about artificial intelligence and the future of evidence, followed by a fireside chat with Liz Mannshardt. The ceremony also recognized recipients of the society's major awards, expanded the president's award to honor three centennial cohorts, and celebrated nine WSS members elected as 2026 ASA Fellows.

Virtual programming remained a cornerstone of WSS activities. The society hosted the Roger Herriot Award Seminar, the Gertrude M. Cox Award Lecture, and a webinar by Jae-Kwang Kim about calibration estimation, together engaging hundreds of participants. WSS also collaborated with RTI International on a webinar series exploring emerging topics in survey research. The inaugural virtual panel, Small Area Estimation and the Future of Survey Research, attracted more than 165 attendees. Additional panels on artificial intelligence and other emerging topics are planned.

Beyond programming, WSS strengthened its organizational foundation by filling several previously vacant volunteer positions, including student representatives, reviving the newsletter's employment column as Job Seeker's Ally, and conducting its annual officer elections through a competitive slate process.

The society also expanded its collaborations across the statistical community. WSS continued its partnership with DC-AAPOR in planning the annual DC-AAPOR/WSS Review Preview Conference scheduled for September 9, sponsored several professional meetings and educational activities, initiated a collaboration with the International Association of Survey Statisticians to develop future short courses, and strengthened partnerships supporting jointly sponsored awards such as the Julius Shiskin Award and Roger Herriot Award.

As part of its centennial celebrations, WSS also partnered with several ASA sections to host a joint mixer at the 2026 Joint Statistical Meetings in Boston, marking the society's first networking mixer at JSM. In addition, WSS organized a topic-contributed session, A Century of Washington Statistics, featuring five past WSS presidents who reflected on the society's history, accomplishments, and future.

As a chapter of the American Statistical Association, the quarterly meetings of ASA chapter presidents have provided valuable opportunities to exchange ideas, learn from other chapters, and strengthen local statistical communities.

Looking ahead, WSS continues to face challenges, including securing stable venues for in-person events, obtaining financial sponsorship, and recruiting volunteers. As we begin our second century, our priorities include growing membership, increasing engagement among students and early-career statisticians, strengthening partnerships, and embracing the opportunities and challenges that artificial intelligence presents for our profession.

To keep up with the WSS, visit its website at *https://washstat.org.* ■

Consider Starting a National Statistics Honorary Society Chapter

Lisa W. Kay, Mu Sigma Rho Past President

As many institutions begin their fall semester, it is a good time to consider starting a Mu Sigma Rho chapter. MSR, the National Statistics Honorary Society, has more than 40 chapters across the United States. Each year, chapters recognize students with outstanding academic accomplishments in statistics. Membership requirements are flexible enough that students with majors in other fields, especially those with a minor or concentration in statistics or data science, qualify. Student members receive a certificate, an MSR honorary pin, and a free one-year student membership in the American Statistical Association.

MSR also presents two awards to exceptional statistics educators each year. The William D. Warde Statistics Education Award is given to a faculty member who has demonstrated excellence in classroom teaching in the statistics discipline and a lifetime devotion to statistics education. The 2026 recipient is Milo Schield of New College of Florida. The Mu Sigma Rho Early Career Undergraduate Impact Award, inspired by George McCabe, recognizes a faculty member who has made significant contributions to the success of undergraduate students in statistics. This year's winner is Zhe Wang of Denison University. Nominations for the awards are typically due in early February. Any college or institution may nominate a potential recipient, regardless of whether the institution has an active MSR chapter.

Other MSR activities at the national level include virtual presentations and haiku contests. Individual chapters host a variety of activities, such as guest speakers, field trips, and social events.

MSR has undergone some changes in recent years, including an updated logo and the addition of a web administrator to its national officers. MSR officers for 2026–2029 are the following:

- President: **David Fardo**
- Vice President: **Rasitha Jayesekere**
- Secretary/Treasurer: **Ananda Jayawardhana**
- Past President: **Charlie Smith**
- Web Administrator: **Matt Heiner**
- Directors-at-Large: **Analisa Flores, Laura Taylor,** and **Mark Daniel Ward**

Anyone who wishes to start a new chapter should contact the MSR secretary, Ananda Jayawardhana, at *ajayawardhana@pittstate.edu* to discuss the requirements. More information can be found on the MSR website at *www.stat.purdue.edu/msr*, and questions may be directed to MSR President David Fardo at *david.fardo@uky.edu.* ■

Submit JSM 2027 Session Proposals and Apply for SRMS Student Travel Awards

James Wagner and Daifeng Han

The Survey Research Methods Section welcomes submissions for invited sessions and applications for student travel awards for the 2027 Joint Statistical Meetings.

Submissions for invited sessions will be accepted until September 23. SRMS members submitting an invited session proposal who want to have SRMS as the sponsoring section must select SRMS at the time of submission. Typical formats for invited sessions are 2–6 participants, including the chair. This could take the form of 2–3 speakers with a discussant or a panel discussion with 3–5 panelists.

Students enrolled in any terminal degree program (bachelor's, master's, or doctoral) in survey methodology or related survey research disciplines are eligible to apply for travel awards. Preference will be given to students who are presenting a paper or poster at JSM. For more information and to submit an application, visit *https://amstat.jotform.com/form/SRMS_Student_Travel_Award_2027.* ■

TELLING OUR STORIES

The goal of the Telling Our Stories video project is to highlight the profound impact of statistics on society. Each video tells the story of how statisticians and data scientists are advancing science, informing public policy, and contributing to a world in which decisions are data-driven.

Check out the videos in the series on the STAT*tr@k* website: *https://stattrak.amstat.org/telling-our-stories.*

Professional Opportunities

Professional Opportunity listings plus equal opportunity information are due the 20th of the month two months prior to when the ad is to be published.

These listings and additional information about these ads can be found at *https://careerconnect.amstat.org/jobs.*

To advertise in *Amstat News,* email *advertise@amstat.org*

To find the latest jobs in statistics and data science, visit ASA Career Connect at *https://careerconnect.amstat.org.*

New York

The Department of Mathematics and Statistics at Vassar College invites applications for a tenure-track position in statistics, at the assistant professor level, to begin in the Fall 2027 semester. For more information on this position, and to apply, please *visit www.mathjobs.org/jobs/list/28671*. Review of applications will begin on October 2, 2026; only applications submitted through MathJobs will be considered. ■

Assistant, Associate and Full Professor positions in the Department of Statistics & Data Science

The Department of Statistics and Data Science at the National University of Singapore (NUS) invites applications for tenure-track and tenured faculty positions in statistics, data science, computer science, and related areas at the Assistant Professor, Associate Professor, and Professor levels. The anticipated start date is July 2027. Applicants should hold a PhD in a relevant field by the time of appointment.

NUS offers internationally competitive salaries, generous research funding, travel support, relocation assistance, and comprehensive benefits. The Department currently has nearly 40 faculty members and provides a vibrant and collaborative research environment. Faculty members benefit from a research-friendly teaching load and strong institutional support for research activities.

The Department offers undergraduate programmes in Statistics, Data Science and Applied AI. We are committed to excellence in both research and education and welcome applicants from all areas of statistics, data science, machine learning, artificial intelligence, computer science, and related disciplines.

For Assistant Professor positions, we seek candidates with outstanding research potential and a strong commitment to teaching. For Associate Professor and Professor positions, we seek candidates with established records of excellence in research, teaching, and academic leadership.

Applicants should submit a cover letter, curriculum vitae, research statement, teaching statement, and at least three letters of recommendation. Recommendation letters should be uploaded directly by the referees.

Applications should be submitted through mathjobs.org. Alternatively, application materials may be sent to lee.pei.ying@nus.edu.sg. Review of applications will begin immediately upon receipt and continue until the positions are filled.

Top Ten Signs I Was in Grad School Too Long

Amstat News continues its lighthearted series from ASA Executive Director Ron Wasserstein with his traditional Top 10 list, first shared on the *Practical Significance* podcast. Ron says, "The academic year is about to begin, and many graduate students may be starting to feel they have been in grad school too long. Well, friends, I hear that. I've been out of grad school for a long time, but I was in grad school for a long time, as well. Too long. So, if you feel you've been at it too long, use my experience as a benchmark. Here are the top 10 signs I was in grad school too long."

Wasserstein

10 My dissertation wasn't so much a work-in-progress as a long-term relationship with commitment issues.

09 My middle name was legally changed to ABD.

08 People stopped asking me when I was going to graduate and instead asked when I was going to retire.

To listen to the *Practical Significance* podcast, visit *https://magazine.amstat.org/podcast-2*.

07 I began thinking of myself as the Cal Ripken Jr. of grad school.

06 The new grad student orientation manual started including a section referring to me as a cautionary tale.

05 My desk in the grad student bullpen was labeled "Hotel California."

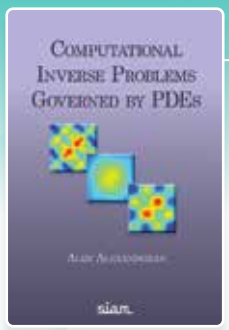
04 During the celebration of my 10th year in grad school, the facilities staff awarded me a key to the building.

03 My graduate career spanned four actors in the role of James Bond.

02 My thesis adviser was an assistant professor when I started and professor emeritus by the time I finished.

#01 I had to hurry to finish grad school before my youngest child did.

New books from SIAM



Computational Inverse Problems Governed by PDEs • Alen Alexanderian

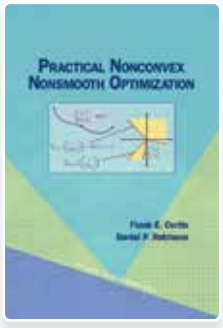
This textbook focuses on computational methods for inverse problems that are governed by partial differential equations (PDEs). The author considers deterministic and Bayesian formulations and highlights how traditional tools from deterministic inversion can be integrated into solution methods for Bayesian inverse problems. Advanced topics such as post-optimality sensitivity analysis, optimal design of experiments, and Bayesian inversion under model uncertainty are also included.

2026 • xvi + 320 pages • Softcover • 9781611978810 • List $89.00 • SIAM Member $62.30 • OT211

Scientific Computing in Modern C++ • Victor Eijkhout

This book is for aspiring computer programmers with a basic knowledge of C++ who want to deepen their understanding of the language, specifically for use in scientific computing. It discusses scientific computing from a software perspective, covering a wide range of topics¬¬, including the finer points of C++, specific idioms of C++ in scientific computing, parallelism, considerations of hardware and performance, and "carpentry" topics, such as CMake, that extend beyond basic programming to make you a more productive programmer. The book focuses on computing "idioms" and applications—rather than a complete treatment of the C++ language—as well as peripheral "carpentry" topics. The C++ topics discussed are chosen for their relevance to computing, and other topics are purposely excluded. Additionally, several topics relevant to scientific computing are included that are not intimately tied to C++ as a language.

2026 • xii + 466 pages • Softcover • 97816119786056 • List $89.00 • SIAM Member $62.30 • SE33



Practical Nonconvex Nonsmooth Optimization • Frank E. Curtis and Daniel P. Robinson

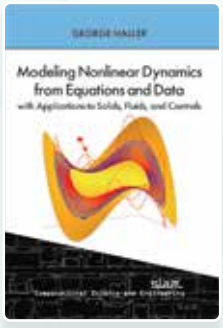
This book provides a clear and accessible introduction to an important class of problems in mathematical optimization: those involving continuous functions that may be nonconvex, nonsmooth, or both. The authors begin with an intuitive treatment of theoretical foundations, including properties of nonconvex and nonsmooth functions and conditions for optimality. They then offer a broad overview of the most effective and efficient algorithms for solving such problems, with a focus on practical applications in areas such as control systems, signal processing, and data science. This book focuses on problems in finite-dimensional real-vector spaces and introduces concepts through nonconvex smooth optimization, making the material more accessible.

2025 • xxvi + 483 pages • Hardcover • 9781611978582 • List $92.00 • SIAM Member $64.40 • MO36

Algorithms from THE BOOK
Second Edition • Kenneth Lange

Most books on algorithms are narrowly focused on a single field of application. This unique book cuts across discipline boundaries, exposing readers to the most successful algorithms from a variety of fields. Since publication of the first edition of *Algorithms from THE BOOK*, the number of new algorithms has swelled exponentially, with the fields of neural net modeling and natural language processing leading the way. These developments warranted the addition of a new chapter on automatic differentiation and its applications to neural net modeling. The second edition also adds worked exercises and introduces new algorithms in existing chapters. In *Algorithms from THE BOOK, Second Edition*, the majority of algorithms are accompanied by Julia code for experimentation, the many classroom-tested exercises at the end of each chapter make the material suitable for use as a textbook, and appendices contain not only background material often missing in undergraduate education but also solutions to selected problems.

2025 • xiv + 343 pages • Softcover • 9781611978384 • List $74.00 • SIAM Member $51.80 • OT204



Modeling Nonlinear Dynamics from Equations and Data
with Applications to Solids, Fluids, and Controls • George Haller

This concise text presents an introduction to the emerging area of reducing complex nonlinear differential equations or time-resolved data sets to spectral submanifolds (SSMs). SSMs are ubiquitous low-dimensional attracting invariant manifolds that can be constructed systematically, building on the spectral properties of the linear part of a nonlinear system. SSM-based model reduction has a solid mathematical foundation and hence is guaranteed to deliver accurate and predictive reduced-order models under a precise set of assumptions. This book introduces the foundations of SSM theory to the novice reader; reviews recent extensions of classic SSM results for the advanced reader; and illustrates the power of SSM reduction on a large collection of equation- and data-driven applications in fluid mechanics, solid mechanics, and control.

2025 • xii + 151 pages • Hardcover • 9781611978346 • List $62.00 • SIAM Member $43.40 • CS34

siam | Society for Industrial and Applied Mathematics

BOOKSTORE

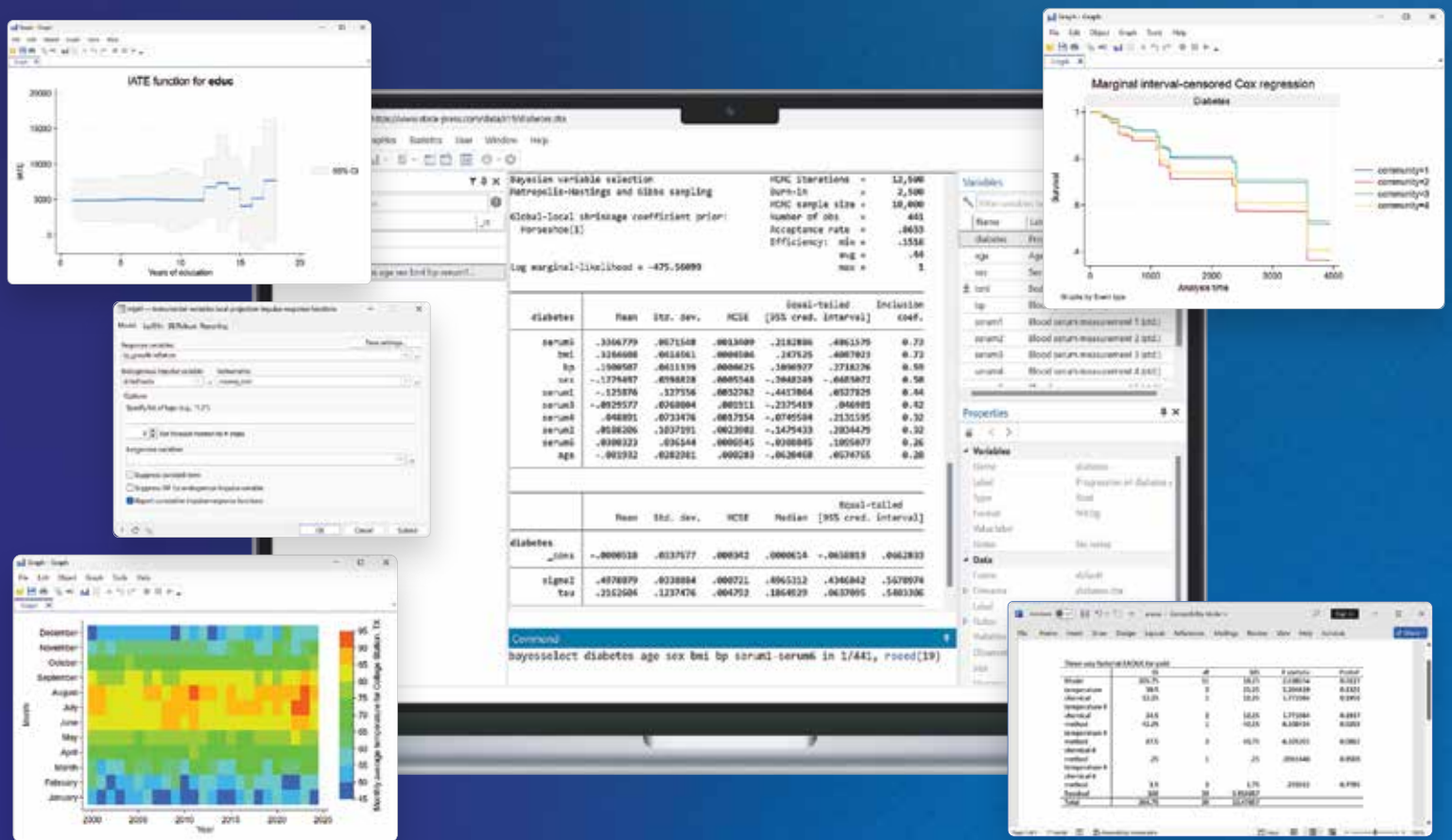
To order: *bookstore.siam.org*

STATA

Work smarter from start to finish.

A streamlined workflow means fewer interruptions and faster progress. Stata combines data management, statistical analysis, graphics, and reporting in one comprehensive package.

Spend less time navigating software and more time making discoveries.



stata.com/amstat-smarter